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ABSTRACT

The source of the information presented in this report is a government-wide data system established by the Committee on Academic Science and Engineering to provide policy makers with comprehensive information on federally funded activities at universities and colleges. Part I, dealing with total federal academic science support, covers trends in funding, academic science by type of activity and agency, fields of science by type of activity and agency, geographic patterns and distribution of funds at the first 100 institutions by type of activity and field of science. Part II presents data on major types of federally funded academic science activities: research and development, facilities and equipment, and science education. Tables, charts, and other illustrations accompany the discussion. (JS)

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FEDERAL FUNDS for academic science

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GENERAL NOTES

- The Federal obligations in this study were reported by 10 agencies that accounted for more than 95 percent of all Federal support for academic science.
- Federal obligations are reported for the Federal fiscal year ending June 30 of the year shown.
- Educational data are totaled for the academic year 1967–68.
- In all tables of this report, details may not add to totals because of rounding. Percentages were calculated on the basis of unrounded figures.
- Tables showing academic science and R. & D. obligations distributed by field of science include estimated data for some $105 million, representing projects for which the Department of Defense was unable to supply field of science information.
- Data in this report on Federal obligations for academic science and R. & D. support for fiscal year 1969 vary somewhat from data appearing in a related report entitled *Federal Support to Universities, Colleges, and Selected Nonprofit Institutions, Fiscal Year* 1969 (NSF 70–27). See technical notes, p. 51.

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FOREWORD

THIS REPORT presents data compiled by the National Science Foundation for the Committee on Academic Science and Engineering (CASE), Carl York, Chairman. The source of the information is the Government-wide data system established by CASE for the purpose of making available to science policymakers comprehensive information on federally funded science activities at universities and colleges. In addition to information on the geographic and institutional patterns of Federal academic science support, it contains data not previously available on fields of science and more detail on the types of science activities funded at institutions of higher education.

The report was prepared under the overall guidance of Charles E. Falk, Director, Division of Science Resources and Policy Studies. The Data Management Systems Office, Edgar W. Barrett, Data Management Systems Officer, was responsible for processing the data. The analysis and preparation of the report were done in the Office of Economic and Manpower Studies, Thomas J. Mills, Head.

W. D. McELROY
Director
National Science Foundation

FEBRUARY 1971

Acknowledgments

This report was developed in the Office of Economic and Manpower Studies, National Science Foundation, under special guidance of Kenneth Sanow, Head, Statistical Surveys and Reports Section. The survey was conducted and the report prepared under the direction of Lawrence A. Seymour, Study Director, Federal Academic Science Studies Group. Major responsibility for coordination and final review was taken by William L. Stewart. The data were compiled and the report written by Cecelia Hilgert, Robert Loycano, Suzanne Sale, and Leonore Wagner. Irene Woodall supervised the preparation of statistical material.

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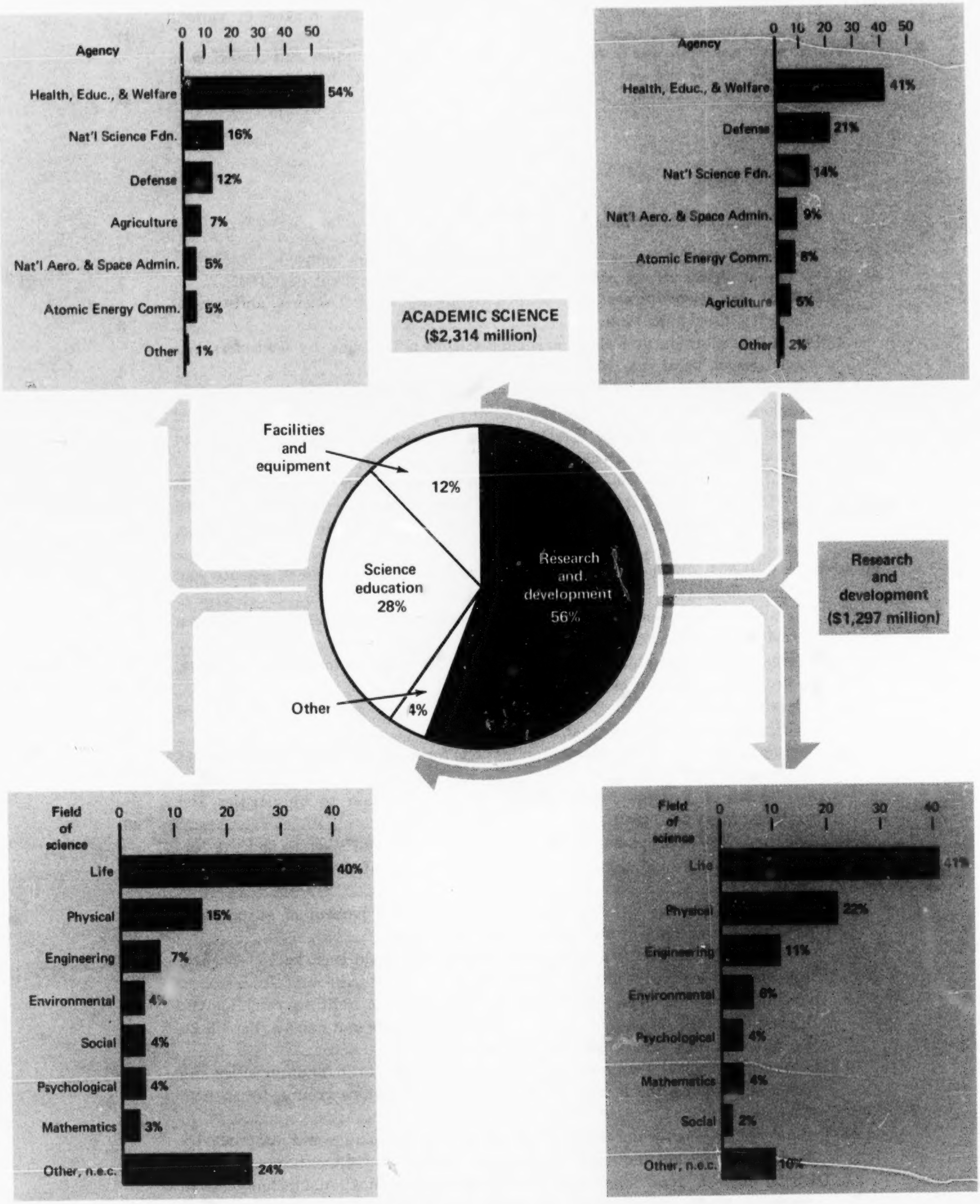
Distribution of Federal obligations for academic science, FY 1969



Source: National Science Foundation (CASE).

SUMMARY

Total Federal Academic Science Support

Sources of funds

Ten Federal agencies reported a total of $2,314 million for academic science activities during fiscal year 1969, representing virtually the same level of Federal funding of academic science as reported for fiscal year 1968. In most program areas the Department of Health, Education, and Welfare (HEW) was the primary source of funds, accounting for a total of $1,245 million, or more than one-half of all obligations from the Federal Government. The National Science Foundation (NSF) with $362 million, or nearly one-sixth of the Federal-wide total, was second in sponsorship of academic science activities. Other agencies contributing significant shares of academic science support in 1969 were the Department of Defense (DOD), $272 million; the Department of Agriculture (USDA), $155 million; the National Aeronautics and Space Administration (NASA), $125 million; and the Atomic Energy Commission (AEC), $121 million (pages 1 to 2).[1]

Types of activity

Nearly 95 percent of Federal academic science funds was concentrated in four of eight major activity categories: Research and development—56 percent, or $1,297 million; facilities and equipment—12 percent, or $275 million; and two of the four activities classified as science education manpower development—19 percent, or $436 million, and general support for science—7 percent, or $157 million (pages 1 to 2).

Fields of science [2]

In 1969 Federal obligations to universities and colleges were distributed among the major fields of science and engineering as follows: *Life sciences*—39 percent, or $918 million; *physical sciences*—15 percent, or $338 million; *engineering*—7 percent, or $168 million; *environmental sciences*—4 percent, or $100 million; *social sciences*—4 percent, or $86 million; *psychology*—4 percent, or $85 million; and *mathematics*—3 percent, or $74 million. A total of $546 million was not classified under a specific scientific field.

HEW obligated 83 percent of the funds devoted to activities in the life sciences and was also the primary source of support for the psychological sciences, 76 percent; social sciences, 58 percent; and "other sciences, not elsewhere classified (n.e.c.)," 53 percent. In the physical sciences the leading contributor was the Department of Defense with an estimated $110 million, or 33 percent of the field total of $338 million. DOD was also the major sponsor of engineering projects at universities and colleges, obligating an estimated

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[1] Page numbers refer to location of detailed discussion of information presented here in summary form.

[2] Academic science and R. & D. obligations by field of science includes estimated data for some $105 million, for which the Department of Defense was unable to supply field of science information. Estimates are reflected in Government-wide totals as well as in the figures shown for DOD. See item 6 of the limitations contained in the technical notes, p. 46.

$57 million for this field or one-third of the total from all agencies.

NSF and DOD ranked first and second, respectively, among Federal agencies supporting work at universities and colleges in the environmental sciences. NSF reported the largest amount of its funding for this field of science as going for oceanography projects. The atmospheric and geological sciences accounted for the major share of DOD's environmental science funds (pages 2 to 4).

Leading States

Nearly one-third of total Federal *academic science obligations* in 1969 went to three States: California, $280 million; New York, $255 million; and Massachusetts, $213 million. In each of these States the proportion of academic science funding allocated to *research and development* was somewhat higher than in the United States as a whole. Of the $748 million going to the above three States, 64 percent funded R. & D. activities, compared to a national average of 56 percent (pages 4 to 6).

First 100 institutions

The first 100 universities and colleges in academic science funding in 1969, representing less than 10 percent of all recipient institutions, accounted for 65 percent or more of funds in every category of activity except educational institutes, seminars, or conferences. These 100 institutions, accounting for as much as 85 percent, or $1,106 million, of total obligations for research and development and 84 percent, or $364 million, of total funding for manpower development, also accounted for more than 80 percent of all Ph. D. degrees and 60 percent of all master's degrees awarded in the sciences and engineering in academic year 1968 (pages 6 to 8).

Research and Development

Federal support for activities related to academic research and development totaled $1,297 million in fiscal year 1969. In addition to this amount, R. & D. activities were supported through research laboratory and equipment awards totaling $44 million and another $2 million for research institutes, seminars, and conferences.

Four agencies obligated 85 percent of the funds for R. & D. performance. HEW, the single largest supporter, awarded $529 million, or 41 percent, of which $437 million was attributable to NIH. DOD, the second highest contributor, obligated $272 million, or 21 percent, followed by NSF with $176 million, or 14 percent, and NASA, with $123 million, or nearly 10 percent.

A total of $958 million, or nearly three-fourths of Federal R. & D. support, was distributed among three fields of science: Life sciences, physical sciences, and engineering. Life sciences predominated by a wide margin, with $530 million allocated to this field as compared to $287 million for physical sciences and $140 million for engineering. In the life sciences, HEW's $396 million support constituted 75 percent of the field total. In the physical sciences as well as in engineering, DOD provided an estimated two-fifths of the total support.

Six States shared $669 million, or 52 percent of Federal R. & D. support. Three of these received $100 million or more: California, $182 million; New York, $154 million; and Massachusetts, $140 million. The other three States were: Illinois, $74 million; Pennsylvania, $65 million; and Texas, $54 million.

A total of 532 institutions participated in Federal R. & D. projects, with 95 percent of the funds awarded to Ph. D.-granting institutions. Among the leading 100 institutions a close correlation prevailed between the relative amounts of R. & D. support and Ph. D. degrees awarded in the sciences and engineering. The proportion of Federal R. & D. support accounted for by these 100 institutions, 86 percent, matched the proportion of Ph. D. degrees awarded.

The $1.8 million obligated for research institute, seminar, or conference projects was attributable almost entirely to NSF and HEW. More than three-fifths of this support was given for projects principally attended by university and college faculty; however, whereas 99 percent of HEW's $0.6 million was allocated to projects in this category, only 41 percent of NSF's $1.1 million was devoted to this purpose, with 54 percent of the funds given for projects mainly attended by graduate students (pages 9 to 18).

Facilities and Equipment

Federal obligations for the construction and operation of science facilities and equipment totaled $275 million, which represented 12 percent of Federal obligations for all academic science activities. HEW obligated five-sixths, or $229 million, of the total in this category of support. More than two-thirds, or $168 million, of the funds supported projects for which no particular field of science could be specified. Projects in the life and physical sciences together accounted for 24 percent of those that were reported under one of the major fields, with $47 million and $19 million, respectively.

The other five agencies that obligated funds for academic science facilities reported $44 million for facilities devoted to research activities. Funds for research facilities comprised only 16 percent of total facilities obligations, well below the $176 million awarded for instructional classrooms and laboratories.

Institutions in the Middle Atlantic division received the largest share of Federal facilities obligations—$71 million. Two of the three States comprising this division, New Jersey and New York, ranked first and third, respectively, in science facilities support. These two States, together with second-ranking Massachusetts, accounted for more than one-third of total science facilities obligations (pages 19 to 25).

Science Education

Manpower development

In fiscal year 1969, Federal agencies awarded $436 million to universities and colleges for manpower development activities, mainly through fellowships and training programs. HEW provided $376 million for these programs, more than 80 percent of which came from the National Institutes of Health and the Health Services and Mental Health Administration, with obligations of $205 million and $98 million, respectively. NSF manpower development funds totaled $54 million.

Among the seven major fields of science, the life sciences accounted for the largest proportion of support, 52 percent; followed by the social sciences, 9 percent; and psychology, 6 percent. The remaining major fields together accounted for less than 9 percent of the total. Twenty-four percent of manpower development support was reported as "other sciences, not elsewhere classified."

The two leading geographic divisions were the Middle Atlantic and the East North Central with 19 percent and 18 percent of the total for manpower development. The next ranking divisions—Pacific, South Atlantic, and New England—together represented another 40 percent.

Institutions awarding doctoral degrees in the sciences and engineering including medical and dental doctorates, accounted for 95 percent of the total support for manpower development. Obligations were heavily concentrated within the group of 100 universities and colleges receiving the largest amounts, as they received 86 percent of the total (pages 28 to 34).

General support for science

Of the $157 million total for general support for science, 68 percent was obligated by the Department of Health, Education, and Welfare and 32 percent by the National Science Foundation. Ninety-six percent of HEW's funds were in support of clinical medicine programs within the life science field. NSF reported 23 percent of its $50 million in general support for science funds for the physical sciences. Over one-half of the NSF's funds supported projects designated "other sciences, n.e.c."

The geographic distribution of general support funds followed a pattern quite similar to that for other activities, with the largest amounts, $33 million and $23 million, reported in the Middle Atlantic and East North Central divisions, respectively.

The first 100 universities and colleges accounted for 79 percent of the $157 million total for general support. NSF funds were highly concentrated among the first 10 institutions which received 45 percent of the Foundation's general support for science obligations (pages 34 to 37).

Other educational activities

Federal funds for the other component categories of science education totaled $50 million, of which $35 million was allocated to the support of educational institutes, seminars, or conferences, and $15 million to the development of educational techniques and materials.

NSF was the predominant source of funding for these activities with its support directed primarily to precollege education in the sciences. NSF funds for educational institutes attended by secondary school teachers amounted to $34 million—97 percent of its total support in this category. Furthermore, 35 percent of NSF's obligations for the development of educational techniques supported programs directed toward precollege education.

Funds for these educational activities were relatively evenly distributed among the various fields of science. Mathematics accounted for the largest share, 32 percent, of obligations for educational institutes; and the social sciences accounted for the largest share, 20 percent, of funds for the development of educational techniques and materials.

Whereas the East North Central division led in receipt of educational institute funds with 22 percent, the Pacific division was the leading division in terms of funds for the development of educational techniques and materials with 29 percent.

The proportion of support received by the top-ranking institutions in each of these categories varied considerably. The first 100 institutions accounted for less than two-thirds of the total amount obligated to educational institutes. In contrast, 85 percent of the total funding for the development of educational techniques and materials was received by the first 50 institutions (pages 37 to 42).

INTRODUCTION

Background

The Congress, Federal administrators responsible for the Government's science policies, and the R. & D. community are presently engaged in a critical examination of the level of funding and direction of Federal science programs. National science policies are being evaluated in terms of social considerations, as well as scientific considerations. In recent years there has been a slowdown in the growth trend in Federal academic science programs from an average annual increase of 18 percent during the 1963–66 period to approximately 2 percent over the following 3-year period.

There have been changes in the nature of the science programs receiving Federal support. For example, more emphasis is being placed on finding solutions to the ever-mounting problems of environmental pollution and urban development. The ability to appraise and, where necessary, redirect the Government's science program is, to a large extent, dependent upon the availability of information concerning current funding patterns. This report represents a step in providing such information. It presents comparable data on Federal obligations for science at universities and colleges in a level of detail not previously available, most notably data on the various types of science activities by field of science.

These data were collected from Federal agencies for the Committee on Academic Science and Engineering (CASE) of the Federal Council on Science and Technology to provide a statistical basis for evaluating Federal academic science programs and the allocating of Federal funds for these programs. The Committee developed two data collection systems for Government-wide reporting of Federal funds for science and engineering activities in institutions of higher education. The first system (CASE I) has been in operation for several years and collects data aggregated to the institutional level by four broad categories of support.[1] The second system (CASE II), from which data for this report were compiled, utilizes project-by-project reporting of Federal funds for academic science, distributed among eight categories representing the major types of science activities undertaken in institutions of higher education.

Federal obligations for higher educational activities considered to be primarily nonscience in nature, such as general support for undergraduate education, were not included in the study. Nonscience support amounted to approximately $1 billion in fiscal year 1969. Other forms of financial assistance by Federal agencies not covered in the study include repayable loans such as those made by the Office of Education, and agency support of Federal employee training and development activities. The report also excludes data on Federal obligations to Federally Funded Research and Development Centers (FFRDC's) administered by universities and colleges.

Details of the system, including definitions of the terms used in the report are included in the technical notes (appendix A).

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[1] The last report issued in the series resulting from the CASE I system was: National Science Foundation, *Federal Support to Universities, Colleges, and Selected Nonprofit Institutions, Fiscal Year 1969* (NSF 70–27) (Washington, D.C. 20402: Superintendent of Documents, U.S. Government Printing Office, 1971.)

Scope and Limitations of Data

This report covers data on federally funded academic science and engineering projects reported by 10 Federal departments and agencies which provide the major portion of the funding for such activities. These agencies are:

Department of Agriculture
Atomic Energy Commission
Department of Commerce
Department of Defense
Department of Health, Education, and Welfare
Department of the Interior
National Aeronautics and Space Administration
National Science Foundation
Department of Labor
Office of Economic Opportunity

Together, these agencies account for 95 percent of all Federal obligations for academic science made directly to 1,131 U.S. universities and colleges.

Each federally funded academic science project included in this report was classified into one of the following "type of activity" categories: research and development; facilities and equipment; manpower development; general support for science; research institutes, seminars, or conferences; educational institutes, seminars, or conferences; development of educational techniques and materials; and "other related activities".

For analytical purposes, the report is divided into two parts. Part I contains an overview of academic science activities. Part II presents a more detailed discussion of specific academic science activities organized into three principal groups: Research and development (section 1) which includes data on R. & D. performance and research institutes, seminars, and conferences; academic science facilities and equipment (section 2); science education (section 3) which incorporates data on manpower development, general support for science,[2] development of educational techniques and materials, and educational institutes, seminars, and conferences.

Field of science data for total academic science and R. & D. obligations for the Department of Defense and "all agencies" include estimates for $105 million of DOD's total obligations of $272 million. The distribution of this $105 million among fields of science was based on the allocation of $167 million for which DOD was able to provide field of science information. Since DOD reports all of its obligations as research and development, these estimates do not affect separate figures shown for any of the other categories of academic science activities.

Statistical tables contained in appendix B show Federal agencies' obligations for the various types of activities, distributed among the leading universities and colleges (ranked in terms of amount received) and geographic divisions and States.

Data on academic science obligations for the 1963–68 period contained in part I were taken from the CASE I system and, therefore, do not include information in the level of detail available from the CASE II system.

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[2] "General support for science" programs permit recipient institutions to distribute Federal funds among various types of science activities. To the extent that such funds are used to support research and development, facilities or any of the other reported types of activities, amounts shown for these categories are understated.

PART I. Total Federal Academic Science Support

Trends in Academic Science Funding

Since 1963 Federal funds for academic science have grown from $1,329 million to $2,314 million, representing an average annual growth rate of 9.7 percent. As table 1 shows, however, the rate of growth in Federal funding of academic science has declined sharply since 1967. From 1963 to 1966 Federal funding of academic science climbed at an average annual rate of 17.7 percent, but in the last 3 years the level of Federal funding tended to stabilize at an annual rate of 2.3 percent. The leveling off in the growth of Federal academic science support is comparable to the trend in total Federal support for higher education, which showed a decline in an average annual growth from 28.7 percent to 4.7 percent between the two periods (chart 1). This downturn in the growth rate is a reflection of several factors, including (1) a relatively high growth experienced between the 1963–66 period, as a result of the initiation of such major legislation as the Higher Education Facilities Act of 1963 and the Higher Education Act of 1965; (2) a squeeze of Federal spending in an effort to curb inflation; and (3) a reappraisal of national commitments in such areas as defense, urban assistance, health, and public welfare.

TABLE 1.—*Federal obligations for academic science, fiscal years 1963–69*

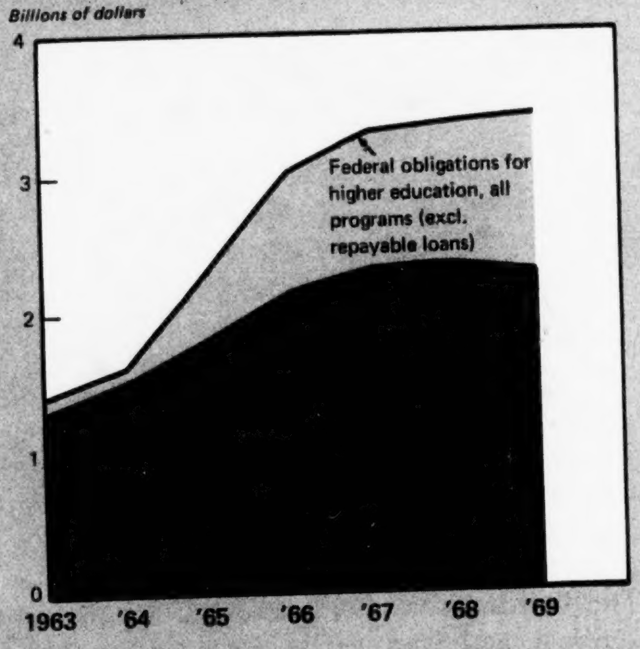
[Dollars in thousands]

Fiscal year	Total obligations	Percent change from previous year
1963	$1,328.5	
1964	1,528.6	15.1
1965	1,816.2	18.8
1966	2,163.5	19.1
1967	2,323.8	7.4
1968	2,349.8	1.1
1969	2,313.7	−1.5

SOURCE: National Science Foundation (CASE).

Chart 1.

Trends in Federal support of higher education, FY 1963-69



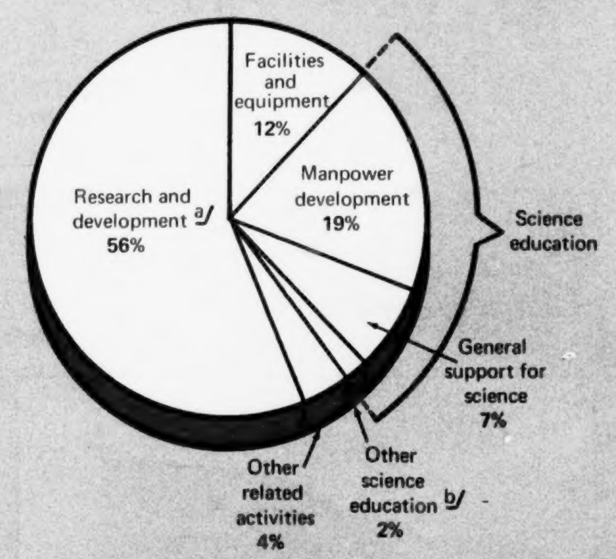
SOURCE: National Science Foundation (CASE).

Academic Science by Type of Activity and Agency

Academic science as defined in this report consists of eight broad categories of activity. As shown in chart 2, nearly 95 percent, or $2,165 million, of the $2,314 million in total Federal academic science funding in 1969 falls in four types of activities: Research and development, 56 percent or $1,297 million; facilities and equipment, 12 percent, or $275 million; manpower development, 19 percent, or $436 million; and general support for science, 7 percent, or $157 million. Of the remaining $149 million, nearly two-thirds, or $96 million were reported under "other related activities." These other activities primarily involve programs sponsored by the Department of Agriculture, spe-

Chart 2.
Federal academic science obligations, by type of activity, FY 1969

TOTAL ACADEMIC SCIENCE
$2,313.7 million



a/ Includes a small amount of obligations (less than 1 percent of total academic science) for research institutes, seminars, or conferences.
b/ Includes development of educational techniques and materials, and educational institutes, seminars, or conferences.
SOURCE: National Science Foundation (CASE).

cifically, the agricultural extension service—a program administered by land grant colleges for the purposes of making available to local farmers information on the latest advances in farming techniques (appendix table B–1).

The distribution of funds among the major types of project activities varies considerably among agencies (chart 3). More than 99 percent of academic science funds from the Department of Health, Education, and Welfare (HEW) were allocated among four of the eight activity categories during fiscal year 1969 with research and development accounting for only 42 percent, or $529 million. By comparison, the academic science programs of the Departments of Defense, the Interior, and Labor, and the National Aeronautics and Space Administration were almost entirely for research and development.

HEW was the largest agency in total funding of academic science with $1,245 million. The major types of activities, in addition to research and development supported by HEW were: Manpower development, $376 million, or 30 percent; facilities and equipment, $229 million, or 18 percent; and general support for science, $107 million, or 9 percent.

The National Science Foundation is the second largest agency in total funding and, like HEW, is concerned with a broad spectrum of academic science activities. Although it is known for its interest in basic research, slightly less than one-half, $176 million, of NSF's 1969 academic science total in this report represented research and development projects.[1] The remaining 51 percent of NSF funds in 1969 supported other activities in the following proportions: 15 percent, or $54 million, for manpower development programs, such as fellowships and traineeships; 14 percent, or $50 million, for general support for science; 10 percent, or $35 million, for educational institutes, seminars, and conferences; 9 percent, or $32 million for new facilities and equipment; 3 percent, or $11 million, for the development of educational techniques and materials for use in science or engineering; and a small amount obligated for research institutes, seminars, and conferences as well as other types of academic science activities.

Fields of Science by Type of Activity

Nearly two-fifths, $918 million, of Federal academic science obligations financed projects in the life sciences (appendix table B–2). In terms of major program activity, 58 percent of total Federal obligations in the life sciences funded R. & D. projects, 25 percent supported manpower development, 12 percent went into general support programs, 5 percent was used for facilities and equipment, and less than 1 percent funded the other four types of activity (chart 3). NIH accounted for $664 million of the life sciences total. Three-fifths, or $384 million, of these NIH obligations funded projects classified under clinical medicine. Nearly all of the remaining NIH funds, $280 million, financed programs within the biological sciences.

Ranking second to the life sciences in Federal obligations was the category "other sciences, not elsewhere classified," with $546 million during fiscal year 1969. Of this total, $390 million, or 71 percent, can be attributed to 3 categories of support—facilities and equipment, research and development, and "other related activities." Support for these activities included large programs that

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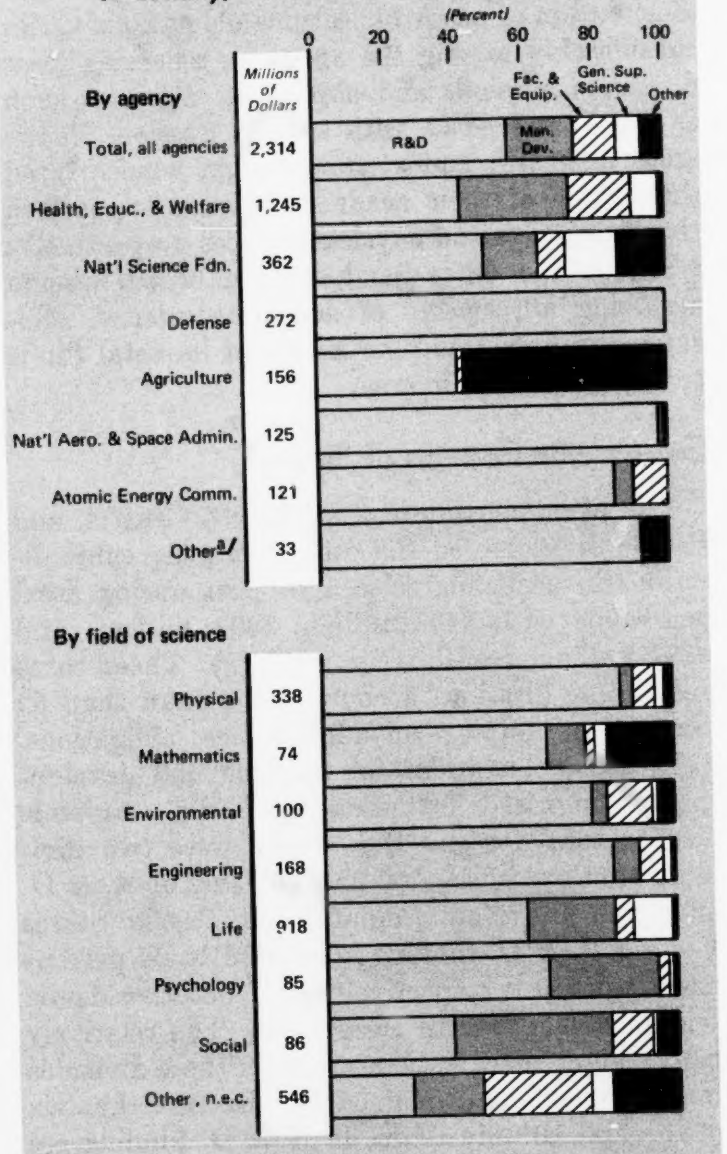
[1] It should be noted that because the eight categories of support used in this report do not represent mutually exclusive areas of activity, e.g., general support for science includes some funds for R. & D. and facilities support, totals computed for more narrowly defined activities such as R. & D. tend to be somewhat understated.

Chart 3.

Federal obligations for academic science, by agency, field of science, and type of activity, FY 1969



a/ Includes Office of Economic Opportunity, the Departments of Commerce, Interior, and Labor.

SOURCE: National Science Foundation (CASE).

cut across several scientific disciplines such as NIH funds for the construction of new facilities and the Department of Agriculture's "lumpsum" R. & D. and agricultural education programs financed through the Hatch, McIntire-Stennis, and Smith-Lever Acts.

The six other major science fields received the remaining 37 percent, or $850 million, of Federal academic science outlays. The physical sciences accounted for 15 percent, or $338 million, of total academic science obligations, most of which consisted of R. & D. funds from DOD, NSF, and AEC in the fields of physics and chemistry. Engineering projects were responsible for some 7 percent ($168 million) and the enviromental, social, and psychlogical sciences and mathematics each received 3–4 percent of the remaining funds that were designated for one of the major fields of science (appendix table B–2).

Among these six fields there is a wide range of emphasis in terms of the eight activity categories. For example, funding levels for the leading types of activity—research and development and manpower development—varied considerably. The ratio of R. & D. support to total funding in a field of science ranged from 85 percent, or $287 million in the physical sciences to 36 percent, or $31 million in the social sciences; funds for manpower development amounted to 45 percent, or $39 million of social science support, but only 4 percent of physical and enviromental science support—$13 million and $14 million, respectively.

Fields of Science by Agency

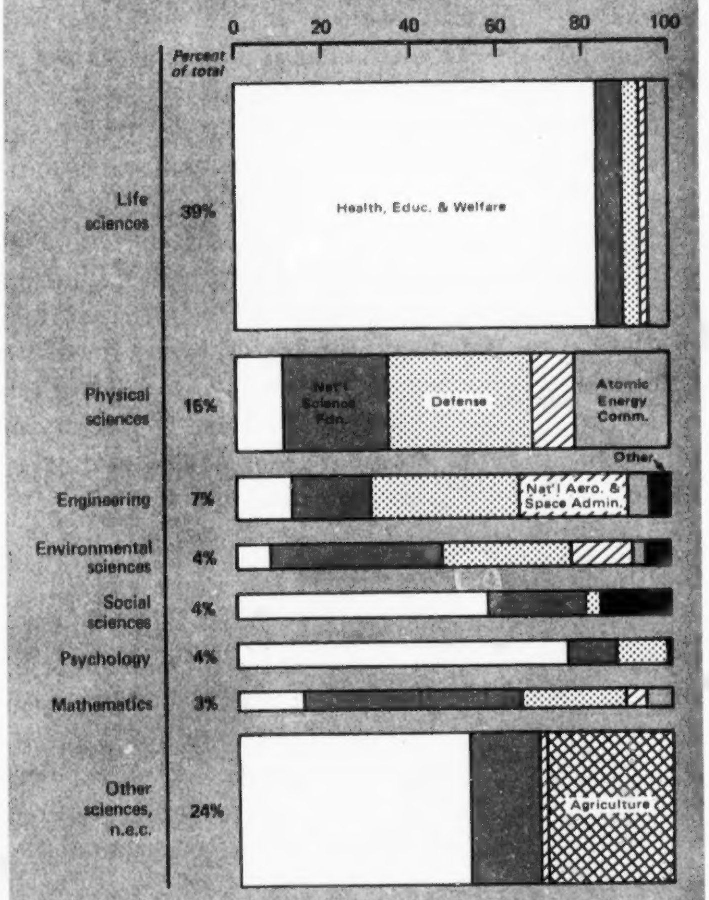
In the life, psychological, social, and "other sciences, n.e.c.," HEW was the primary source of support (chart 5). Funds from HEW comprised 83 percent, 76 percent, 58 percent, and 53 percent, respectively, of total obligations for work performed in these fields which together accounted for 94 percent of this agency's total academic science obligations in fiscal year 1969.

In the physical sciences, the third largest among the eight categories, the leading contributor was the Department of Defense with an estimated $110 million or 33 percent of the $338 million field total (appendix table B–3). This was also the highest funded field for both the National Science Foundation and the Atomic Energy Commission—$83 million and $72 million, respectively. Within the physical sciences, physics accounted for four-fifths of DOD's and AEC's funding and one-half of the NSF physical science support.

DOD was also the major sponsor of engineering projects at universities and colleges, obligating $57 million for this field or one-third of the total from all agencies. Engineering accounted for the largest part ($41 million) of NASA's academic science total, representing one-fourth of the Government's funding of projects in this field. Significant amounts were also obligated to engineering projects by NSF and HEW—$31 million and $22 million, respectively.

NSF and DOD ranked first and second, re-

Chart 4.
Percent distribution of Federal academic science obligations, by field of science and agency, FY 1969



SOURCE: National Science Foundation (CASE).

spectively, among Federal agencies supporting work at universities and colleges in the environmental sciences. The Foundation accounted for 39 percent of the environmental science total compared to 29 percent from DOD. For both agencies, the atmospheric and geological sciences accounted for major shares of environmental science funds although the NSF reported the largest amount of its funding for this field of science as going for oceanography projects.

Receiving the lowest amount of obligations among the major field categories was mathematics with $74 million, one-half of which came from NSF. Three-fourths of the remainder came from DOD and HEW. Research accounted for virtually all of mathematics funds from all of the agencies sponsoring activities in this field except NSF; for NSF, research accounted for 40 percent of the agency's mathematics total with the remaining obligations spread throughout all of the other types of activities, principally educational institutes, seminars, or conferences.

It should be noted that the field of science distribution of academic science obligations varies considerably among the agencies, reflecting their disparate missions and objectives. Agencies such as HEW and AEC, with specific missions in the areas of health and atomic energy, concentrated three-fifths of their academic science support in the life sciences and physical sciences, respectively; NSF, on the other hand, with a broad mission involving all aspects of academic science, allocated no more than one-fourth of its total funds to any one scientific area.

Geographic Patterns of Support

The Middle Atlantic, East North Central, and Pacific divisions led the other five geographic divisions in academic science support during fiscal year 1969 with $449 million, $393 million, and $381 million, respectively (table 2). These three geographic divisions accounted for more than 52 percent of total academic science obligations.

In 1969, obligations for research and development comprised 56 percent of the academic science total for the U.S. There were two divisions that exceeded a 60-percent level of R. & D. effort; in the New England and Pacific States Federal R. & D. funding amounted to 64 percent and 62 percent, respectively, of Federal academic science obligations to these areas. The relatively high volume of R. & D. activity in these divisions may be partially explained by the fact that six of the first 10 universities in R. & D. funding are located in Massachusetts and California.

In contrast to the New England and Pacific divisions, the West North Central and East South Central divisions, as well as the outlying areas, each showed less than one-half of Federal academic science obligations reported under research and development. It is significant to note that none of the first 10 universities in Federal R. & D. funding, and only two of the first 25, are located within these three divisions.

California institutions were the leading recipients of Federal funds for academic science; they received $280 million, 65 percent of which was allocated to research and development—9 percent more than the corresponding percentage for all U.S. institutions. Universities and colleges in New York received $255 million with 60 percent

TABLE 2.—*Federal obligations for academic science, by geographic division, State, and type of activity, fiscal year 1969*

[Dollars in thousands]

Geographic division and State	Total	Research and development	Manpower development	Facilities and equipment	General support for science	Research institutes, seminars, or conferences	Educational institutes, seminars, or conferences	Development of educational techniques and materials	Other related activities
United States, total	$2,313,741	$1,296,997	$436,270	$274,798	$156,989	$1,805	$35,165	$15,272	$96,445
New England	289,419	185,096	44,804	43,713	9,591	188	2,317	323	3,387
Maine	2,301	971	164	55	-----	100	361	7	643
New Hampshire	9,360	5,916	1,017	1,141	639	-----	247	20	380
Vermont	9,695	3,520	1,078	3,628	925	8	73	-----	463
Massachusetts	213,182	139,525	29,985	35,640	5,591	80	1,013	274	1,074
Rhode Island	14,510	8,926	2,193	1,913	956	-----	248	18	256
Connecticut	40,371	26,238	10,367	1,336	1,480	-----	375	4	571
Middle Atlantic	448,974	243,655	84,880	71,078	33,179	164	5,079	2,871	8,068
New York	255,463	153,762	53,509	21,598	19,166	96	2,704	1,442	3,186
New Jersey	75,235	25,271	5,926	40,918	1,511	-----	699	81	829
Pennsylvania	118,276	64,622	25,445	8,562	12,502	68	1,676	1,348	4,053
East North Central	392,797	219,377	78,039	48,107	23,369	336	7,567	1,721	14,281
Ohio	71,923	36,573	15,363	9,003	6,117	36	1,322	73	3,436
Indiana	55,362	26,996	9,736	12,000	2,317	-----	1,711	113	2,489
Illinois	128,233	74,246	25,560	15,525	7,122	30	1,901	782	3,067
Michigan	84,277	49,918	17,428	6,652	4,849	168	1,823	665	2,774
Wisconsin	53,002	31,644	9,952	4,927	2,964	102	810	88	2,515
West North Central	163,172	80,704	35,654	10,265	18,426	73	3,598	1,452	13,000
Minnesota	41,070	24,411	9,592	796	2,638	10	545	594	2,484
Iowa	27,528	14,357	5,834	1,870	1,790	52	779	361	2,485
Missouri	51,837	23,813	11,992	4,457	8,141	10	429	23	2,972
North Dakota	4,944	2,375	481	425	232	-----	422	-----	1,009
South Dakota	4,788	2,402	449	101	282	-----	588	-----	966
Nebraska	11,679	3,316	2,373	470	3,823	1	204	89	1,403
Kansas	21,326	10,030	4,933	2,146	1,520	-----	631	385	1,681
South Atlantic	281,158	145,417	61,333	27,448	22,958	299	4,412	1,618	17,678
Delaware	6,363	2,233	422	3,243	-----	-----	162	-----	303
Maryland	55,003	33,716	12,582	3,527	3,078	20	571	202	1,307
District of Columbia	24,738	13,961	5,944	1,069	3,392	-----	233	18	121
Virginia	27,687	12,162	5,637	2,125	4,085	52	837	145	2,644
West Virginia	8,500	3,522	1,441	872	926	-----	128	15	1,596
North Carolina	68,753	35,128	17,129	6,786	3,818	63	698	381	4,750
South Carolina	10,304	3,891	1,461	930	1,279	-----	446	7	2,290
Georgia	33,277	14,524	7,377	5,094	2,314	7	646	114	3,201
Florida	46,533	26,280	9,340	3,802	4,066	157	691	736	1,461
East South Central	91,875	41,839	15,728	10,167	9,459	15	1,703	421	12,543
Kentucky	19,655	9,451	2,983	1,736	2,141	-----	211	63	3,070
Tennessee	37,904	17,344	7,701	3,627	5,092	15	622	242	3,261
Alabama	22,294	9,798	3,600	4,165	1,243	-----	366	61	3,061
Mississippi	12,022	5,246	1,444	639	983	-----	504	55	3,151
West South Central	144,689	76,357	25,617	15,918	9,184	230	3,818	1,734	11,831
Arkansas	8,519	3,549	1,190	340	823	-----	223	-----	2,394
Louisiana	28,618	11,484	6,882	4,440	2,415	-----	895	405	2,097
Oklahoma	16,284	6,879	3,603	1,003	1,634	-----	1,049	32	2,084
Texas	91,268	54,445	13,942	10,135	4,312	230	1,651	1,297	5,256
Mountain	109,253	63,143	17,798	9,882	9,615	350	2,388	744	5,333
Montana	4,198	2,105	595	368	92	-----	295	23	720
Idaho	3,789	1,203	182	1,207	226	-----	236	9	726
Wyoming	3,043	1,604	254	155	218	-----	357	-----	455
Colorado	36,388	21,127	8,081	2,728	2,157	297	346	539	1,113
New Mexico	15,450	11,784	1,103	910	645	9	225	21	753
Arizona	19,506	9,520	2,929	1,396	4,344	21	529	100	667
Utah	24,015	13,995	4,467	2,749	1,809	-----	353	45	597
Nevada	2,864	1,805	187	369	124	23	47	7	302
Pacific	380,698	237,161	69,588	37,660	20,116	133	4,054	4,388	7,598
Washington	53,099	25,857	11,420	11,882	1,515	26	804	72	1,523
Oregon	28,090	13,770	5,958	3,519	2,157	3	1,018	594	1,071
California	279,580	182,088	50,637	20,913	15,851	93	1,953	3,722	4,323
Alaska	8,306	7,576	221	117	69	-----	71	-----	252
Hawaii	11,623	7,870	1,352	1,229	524	11	208	-----	429
Outlying areas [1]	11,706	4,248	2,829	560	1,092	17	229	-----	2,731

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[1] Includes Puerto Rico, Virgin Islands, and Guam. The amounts to the Virgin Islands and Guam were a small fraction of the total.

Source: National Science Foundation (CASE).

allocated to research and development, slightly higher than the national average for this activity. Massachusetts ranked third in obligations for academic science, receiving $213 million, with 65 percent of total funds allocated to research and development. An additional 17 percent of academic science obligations for Massachusetts was reported under facilities and equipment, which represented twice the proportion of facilities funds obligated to institutions in California and New York.

The pattern of distribution of R. & D. obligations among the States varied considerably. Federal R. & D. obligations as a percent of a State's total academic science obligations ranged from 91 percent in Alaska to 28 percent in Nebraska. In 27 States, R. & D. funds comprised more than one-half of academic science support.

Only in five States did R. & D. obligations rank second to another objective of support. Federal funds for facilities and equipment support to universities and colleges in each of four States—Vermont, New Jersey, Delaware, and Idaho—were greater than R. & D. amounts going to these States. The amounts allocated for facilities and equipment at the institutions in these four States relative to their total academic science funds ranged from 32 percent in Idaho to 54 percent in New Jersey. In the case of New Jersey the level of academic science funding was significantly influenced by $35 million from the National Institutes of Health for the expansion of facilities at the New Jersey College of Medicine and Dentistry. This one institution out of the 19 recipients in New Jersey accounted for 49 percent of the State's academic science total.

Nebraska is the fifth State showing research and development ranking second to another academic science activity. Here, Federal obligations reported under general support for science amounted to $3.8 million compared to $3.3 million in R. & D. obligations. Funding for general support for science accounted for 33 percent of total academic science obligations in Nebraska, whereas on a national scale this activity accounted for only 7 percent of total Federal academic science obligations. The only other State with a relatively high amount awarded for general support for science was Arizona where such funds, primarily from NSF, comprised 22 percent of total academic science obligations.

Distribution of Funds at the First 100 Institutions by Type of Activity

Chart 5 presents a summary of the 100 institutions receiving the largest amounts of Federal funds by type of activity. They received a total of $1,870 million, which was 81 percent of the U.S. total. Amounts of funds received by institutions in this group ranged from $86 million at Massachusetts Institute of Technology down to $6 million at New Mexico State University.

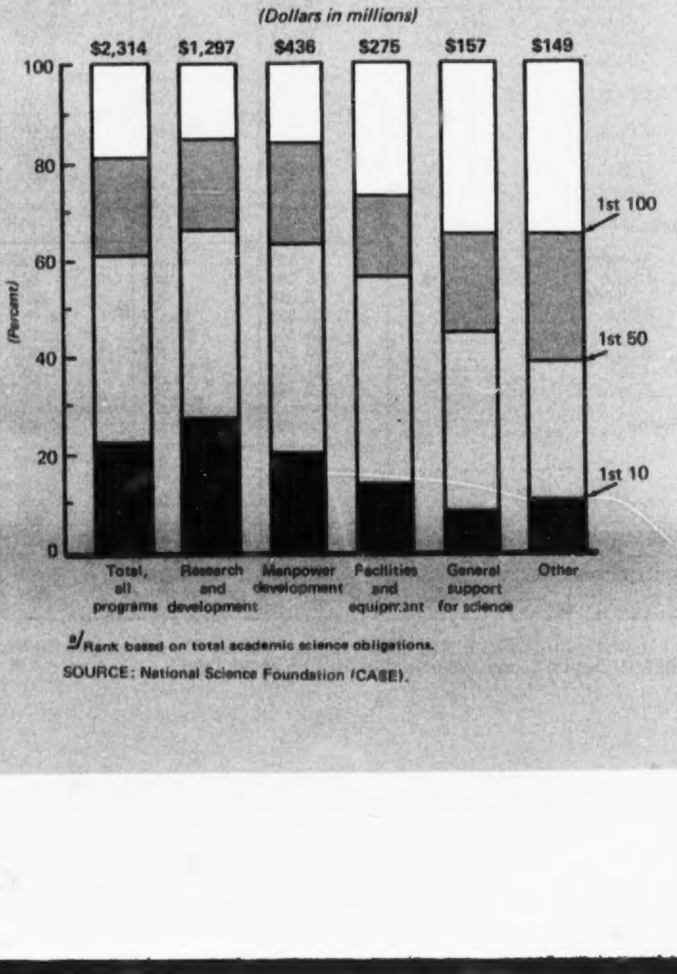
The first 100 universities and colleges in academic science funding, less than 10 percent of all institutional recipients, accounted for 65 percent or more of funds to all institutions in every category of activity except educational institutes, seminars, or conferences. These 100 institutions accounted for as much as 85 percent, or $1,106 million, of total obligations for research and development and 84 percent, or $364 million, of total funding for manpower development (appendix table B-4).

Massachusetts Institute of Technology, the largest recipient of Federal funds for academic science at $86.3 million, showed $77.4 million in research and development, nearly 90 percent of the institution's total. This was, by far, the highest

Chart 5.

Federal academic science obligations to universities and colleges, ranked[a] in various groups, by type of activity, FY 1969

(Dollars in millions)



[a] Rank based on total academic science obligations.

SOURCE: National Science Foundation (CASE).

proportion of research and development to total program activity conducted by any of the major universities. Harvard University, which ranked second in total academic support with $62.9 million, showed a wider distribution of funds with 61 percent going to research and development, 20 percent to manpower development, and 17 percent to facilities and equipment.

Only six of the first 100 institutions did not show research and development as the leading category of support (appendix table B–5). For each of the six institutions, the major program was construction of new facilities. Five of the institutions received support from the National Institutes of Health for new medical and dental facilities. These included the New Jersey College of Medicine and Dentistry, the University of Massachusetts, Indiana University-Indianapolis, the University of Illinois Medical Center, and the Albany Medical College.

Of the first 100 institutions in total academic science support, 97 received funds for each of the four leading activity categories of Federal funding—research and development, manpower development, facilities and equipment, and general support for science. The exceptions were the University of Texas—Southwestern Medical School, Carnegie Mellon University (no funds reported under facilities and equipment), and the University of Delaware (no funds reported under general support for science).

The leading 100 institutions in Federal academic science obligations accounted for four-fifths of total obligations going to the 1,131 recipient institutions. Within the first 100, the distribution of funds is also heavily weighted near the top. For example, in fiscal year 1969 the first 10 institutions received more funds, $508 million, than the second 50 institutions, $460 million.

Since research and development is the predominant federally supported activity at the first 100 institutions, funds for research and development significantly affect the distribution of total academic science obligations among these institutions. When the institutions are ranked in groups, the relationship between the research and development and academic science distributional patterns of support becomes evident. Exclusive of the first 10 institutions, there is less than a 1-percentage point difference between relative amounts of research and development and academic science support received by each group within the top 50 institutions.

There is also a high degree of correlation between the allocation of funds for manpower development activities and the allocation of funds for total academic science support among the first 100 institutions. Significant differences in the dispersion of support, however, can be noted in several of the other categories.

The $157 million in obligations for general support for science are not as heavily concentrated among the leading recipients as funds for most of the other program activities. Thus, the leading 10 universities in academic science funding received 22 percent of total academic science obligations, but only 8 percent of total funds allocated to general support for science. Sixty-one percent of the academic science total, but only 45 percent of the funds for general support for science, went to the first 50 institutions. The variance in the degree of concentration between total and general support funds can be partially explained by the fact that the general support for science programs primarily emphasize a wider dispersion of funds for the development of scientific capability among a broader base of institutions than do programs under the other type of activities.

Distribution of Funds at the First 100 Institutions by Field of Science

Among individual fields of science there is little variation in the proportion of funds received by the 100 institutions receiving the largest amounts of academic science support. These top 100 institutions accounted for 83 percent of the funding in the life sciences, 85 percent in the physical sciences, 82 percent in environmental sciences, 79 percent in psychology, 79 percent in engineering and mathematics, and 72 percent in the social sciences (table 3).

Within the first 100 institutions, support in the physical sciences and engineering showed the heaviest concentration in the distribution of funds. The first 100 institutions in academic science obligations accounted for one-third of total obligations in each of these two fields. Federal obligations to the first 50 institutions in total academic science support (4 percent of all recipient institutions) for projects in the physical sciences and engineering amounted to 71 percent, or $239 million, and 62 percent, or $105 million, of the respective field totals. These 50 institutions also accounted for 54 percent to 65 percent of the totals for each of the six other major science fields.

TABLE 3.—*Federal obligations for academic science to universities and colleges receiving the largest amounts, ranked in various groups, by field of science, fiscal year 1969* [1]

[Dollars in thousands]

Number of institutions (ranked in order of academic science obligations)	Total	Physical sciences	Mathematics	Environmental sciences	Engineering	Life sciences	Psychology	Social sciences	Other sciences, n.e.c.
Total, all institutions:									
Amount of obligations	$2,313,741	$337,716	$73,555	$99,580	$168,006	$918,464	$84,684	$86,199	$545,537
Percent of total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
First 10:									
Amount of obligations	507,549	110,301	19,381	27,706	54,593	190,068	19,467	20,307	65,726
Percent of total	21.94	32.66	26.35	27.82	32.49	20.69	22.99	23.56	12.05
Second 10:									
Amount of obligations	338,145	49,073	9,173	17,702	12,350	149,195	12,731	11,320	76,601
Percent of total	14.61	14.53	12.47	17.78	7.35	16.24	15.03	13.13	14.04
Third 10:									
Amount of obligations	233,297	31,326	4,896	5,000	10,082	96,130	7,914	8,001	69,948
Percent of total	10.08	9.28	6.66	5.02	6.00	10.47	9.35	9.28	12.82
Fourth 10:									
Amount of obligations	189,330	30,375	6,271	11,368	17,709	76,568	7,398	3,867	35,774
Percent of total	8.18	8.99	8.53	11.42	10.54	8.34	8.74	4.49	6.56
Fifth 10:									
Amount of obligations	141,437	18,139	3,957	2,516	10,159	51,403	4,640	5,291	45,332
Percent of total	6.11	5.37	5.38	2.53	6.05	5.60	5.48	6.14	8.31
First 50:									
Amount of obligations	1,409,758	239,214	43,678	64,292	104,893	563,364	52,150	48,786	293,381
Percent of total	60.93	70.83	59.38	64.56	62.43	61.34	61.58	56.60	53.78
Second 50:									
Amount of obligations	460,050	48,969	14,076	17,369	28,133	197,672	15,113	13,536	125,182
Percent of total	19.88	14.50	19.14	17.44	16.75	21.52	17.85	15.70	22.95
First 100:									
Amount of obligations	1,869,808	288,183	57,754	81,661	133,026	761,036	67,263	62,322	418,563
Percent of total	80.81	85.33	78.52	82.01	79.18	82.86	79.43	72.30	76.72
All other:									
Amount of obligations	443,933	49,533	15,801	17,919	34,980	157,428	17,421	23,877	126,974
Percent of total	19.19	14.67	21.48	17.99	20.82	17.14	20.57	27.70	23.28

[1] Table includes imputations for some $105 million in Department of Defense R. & D. obligations, representing grants, and contracts for which DOD was unable to supply field of science breaks.

SOURCE: National Science Foundation (CASE).

It should be noted that the concentration of science funds among the 50 leading universities and colleges is comparable to the number of Ph. D. degrees in the sciences and engineering awarded by these institutions; these 50 institutions accounted for more than three-fifths of Federal funds in most science fields and they awarded more than three-fifths of total Ph. D. degrees in the sciences and engineering.

Part II. Major Types of Federally Funded Academic Science Activities

Research facilities & research institutes, seminars, or conferences
56%

Section I. Research and Development

FEDERAL R. & D. SUPPORT at academic institutions encompasses three aspects: Research and development itself; research facilities, that is, the construction and basic operation of research laboratories and equipment; and research institute, seminar, or conference projects. By far the largest component of these is research and development per se, which constituted 97 percent of the $1,343 million total support for academic R. & D. activities during fiscal year 1969 (table 4). Research facilities funding totaled $44 million, and research-oriented meetings of various kinds, almost $2 million.

TABLE 4.—*Federal obligations to universities and colleges for total R. & D. support, by agency and R. & D. objective, fiscal year 1969*

[Dollars in thousands]

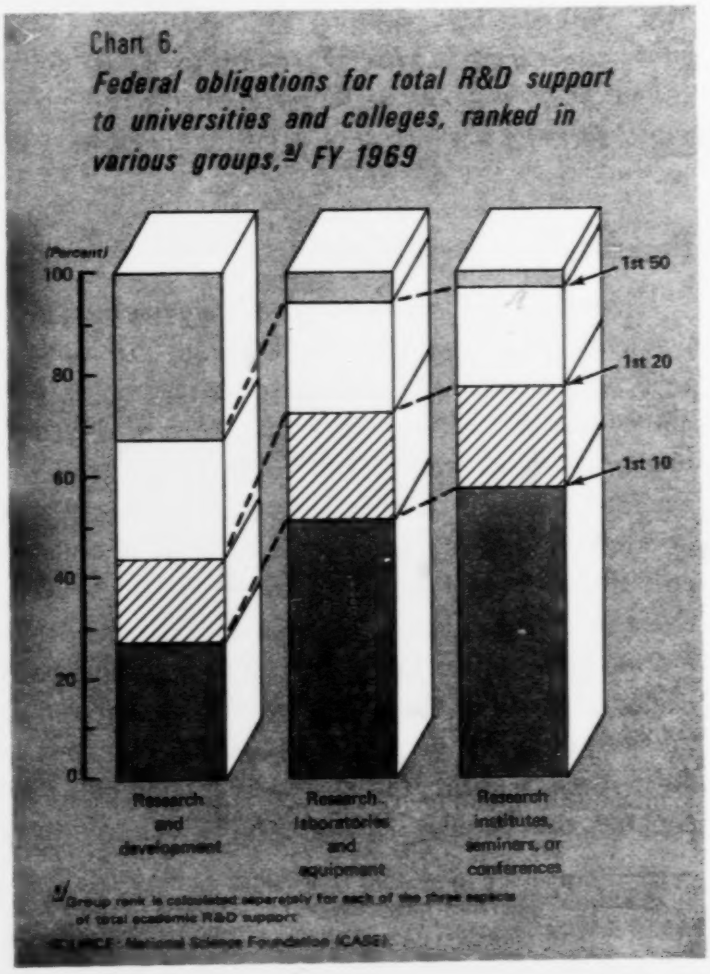
Agency	Total	Research and development	Research laboratories and equipment	Research institutes, seminars, or conferences
Total, all agencies	$1,342,552	$1,296,997	$43,750	$1,805
Department of Agriculture	64,523	63,352	1,171	----------
Atomic Energy Commission	113,434	103,141	10,293	----------
Department of Commerce	1,508	1,408	----------	100
Department of Defense	271,874	271,874	----------	----------
Department of Health, Education, and Welfare	550,487	528,858	21,059	570
Department of the Interior	19,742	19,742	----------	----------
National Aeronautics and Space Administration	123,244	123,233	11	----------
National Science Foundation	188,238	175,887	11,216	1,135
Office of Economic Opportunity	7,007	7,007	----------	----------
Department of Labor	2,495	2,495	----------	----------

SOURCE: National Science Foundation (CASE).

Only two agencies, HEW and NSF, supported

Chart 6.

Federal obligations for total R&D support to universities and colleges, ranked in various groups,[a] *FY 1969*



[a] Group rank is calculated separately for each of the three aspects of total academic R&D support.

SOURCE: National Science Foundation (CASE).

all three R. & D. aspects. It should be noted, however, that all DOD academic science funding is reported under the R. & D. heading as that agency is unable to furnish a finer breakdown. Also, the research facilities discussed here represent only a small portion of the academic science facilities analyzed in greater detail in section 2 of this report, and they exclude such items as computer facilities which, although used in connection with research, are separately reported.

As can be seen from the data presented in chart 6, the 20 institutions showing the highest R. & D. support received 43 percent of R. & D. funds, whereas the 20 highest recipients of research facilities and of research institute, seminar, or conference projects support received 72 percent and 77 percent, respectively, of total funds obligated for those two purposes. The greater concentration of funds shown for the two research-related activities is partly attributable to the fact that fewer institutions were involved—104 and 65 for research facilities and research-oriented meetings, respectively, compared with 532 for research and development—and partly to the nature of the activities. Laboratory and equipment construction projects, for example, are largely long-term investments, and data representing funds for a given year cannot be correlated directly with ongoing research projects funding for that year at a particular institution.

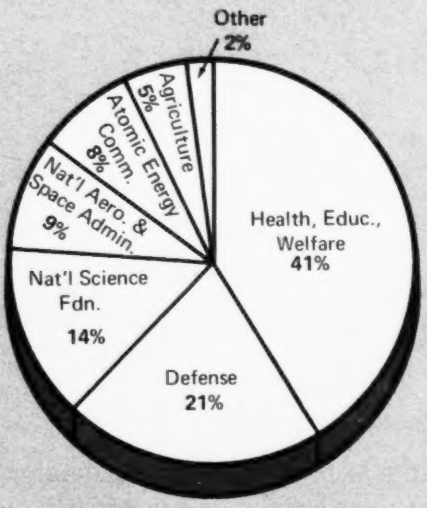
Research and Development

Federal support of research and development at academic institutions has traditionally been heavily oriented toward the research (basic and applied) end of the spectrum, rather than toward development. In fiscal year 1969, for example, for the agencies covered in this report, an estimated 92 percent of the Federal R. & D. support to colleges and universities was allocated to research. This average would have been several percentage points higher had DOD and NASA funds been excluded. Both of these agencies directed about 15 percent of their academic R. & D. support to development, compared to 5 percent for all other agencies combined.[2]

Chart 7.

Federal R&D obligations to universities and colleges, by agency, FY 1969

TOTAL, ALL AGENCIES
$1,297 million



SOURCE: National Science Foundation (CASE).

Federal R. & D. obligations to academic institutions during fiscal year 1969 totaled $1,297 million, of which 85 percent was funded by four agencies (chart 7). The single largest contributor was the Department of Health, Education, and Welfare, whose $529 million in obligations were largely attributable to National Institutes of Health funding. The Department of Defense, the second largest supporter of research and development, obligated $272 million, and the National Science Foundation and the National Aeronautics and Space Administration, $176 million and $123 million, respectively.

Fields of science

A total of $958 million, or nearly three-fourths of the Federal R. & D. support, was allocated among three of the seven primary fields of science: life sciences, physical sciences, and engineering. An additional $130 million, or about 10 percent of R. & D. obligations, were listed under "other sciences, not elsewhere classified," indicating funds that either cut across primary-field lines or did not properly fit into any of the other categories (appendix table B–6). The Department of Agriculture so-called "lump-sum awards," for example, could not be allocated to specific fields, nor could

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[2] National Science Foundation, *Federal Funds for Research, Development, and Other Scientific Activities, Fiscal Years 1969, 1970, and 1971*, Vol. XIX (NSF 70–38) (Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office, 1971.)

9 percent of HEW support.[3] Together, these two agencies accounted for four-fifths of the "other sciences, n.e.c." total.

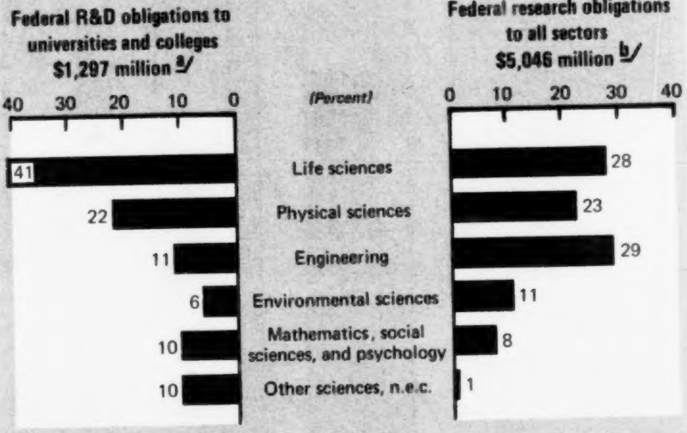
Life science research and development predominated by a wide margin, with $530 million allocated to this field as compared to $287 million for the physical sciences and $140 million for engineering. This pattern differs considerably from the distribution of overall Federal research funds for all performers, where engineering and life sciences are virtually equal, with physical sciences only slightly less (chart 8). The difference between the distribution of the Federal academic R. & D. funding and the pattern of overall Federal research support is largely attributable to HEW, which was the main contributor to the life sciences and which also allocated a far higher proportion of its funds to academic institutions than did DOD, NASA, and AEC, the three agencies more heavily committed toward engineering and the physical sciences. In fact, the difference would have been still greater had the two series been strictly comparable, as about 15 percent of both DOD and NASA academic R. & D. support was for development which is excluded in the overall Federal research figures cited.

The HEW support of $396 million for life sciences constituted three-fourths of the field total as well as of HEW R. & D. funding (chart 9 and appendix table B–6). This concentration within the life science field was attributable to NIH support; for some of the less heavily funded components of HEW, such as the Health Services and Mental Health Administration, or the Consumer Protection and Environmental Health Service, life science funding constituted about one-third of R. & D. obligations.

Although overshadowed by HEW in terms of dollar amounts, other agencies also made substantial contributions to the life science field. The National Science Foundation, the Atomic Energy Commission, and the Department of the Interior allocated more than 20 percent of their R. & D. support to this field; DOD—although in dollar support almost equaling NSF—as well as NASA allocated only 14 percent of their obligated funds to life sciences.

Chart 8.

Comparison of Federal R&D obligations to universities and colleges with Federal research obligations to all sectors, for selected agencies, by field of science, FY 1969



a/ Research component of R&D obligations estimated at 92 percent.

b/ Agencies reporting under the CASE system were used to compute Federal research obligations to all sectors.

SOURCE: National Science Foundation (CASE).

A breakdown by detailed fields indicates that, with the exception of HEW and NSF, the major life science support of agencies was heavily oriented toward biological sciences (appendix table B–7). HEW funding was divided 5:4 between the biological sciences and clinical medicine; NSF's obligations were shown under "life sciences, n.e.c.," although the emphasis of this research was on the biological side. Clinical medicine funding for agencies other than HEW totaled only $11 million, about one-half of which was contributed by DOD.

It should be noted that despite the existence of a separate and less highly funded environmental science field, considerable research regarding our environment is performed under the heading of life sciences. The theoretical distinction between the two fields is that the environmental science field excludes biological studies, although in actual practice a certain overlap is inevitable,

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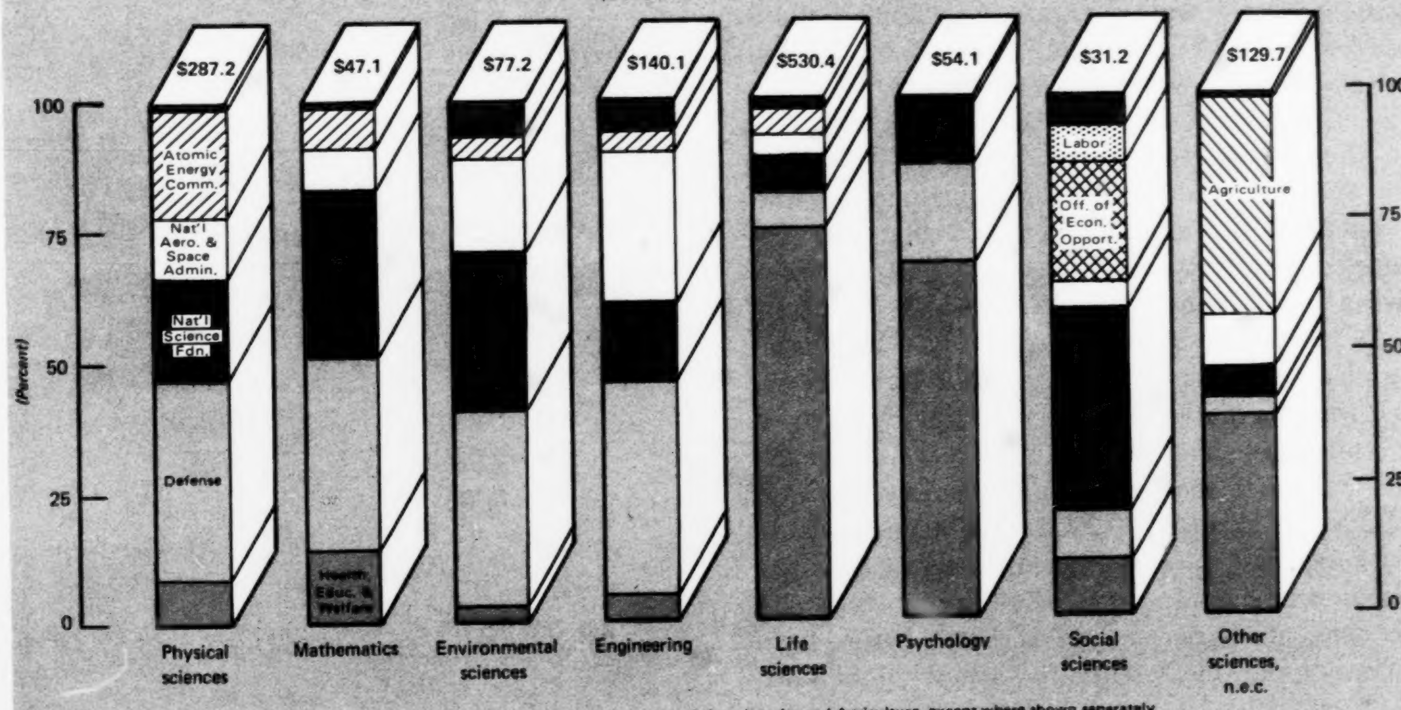
[3] Under two Congressional Acts, the Hatch Act and the McIntire-Stennis Act, funds are made available annually for research and development to State experiment stations of land-grant institutions (and to a limited number of forestry schools not connected with land-grant institutions) under formulas based on farm-plus-rural population, with the formulas dependent on the Act involved. Each award under these Acts is reported as one project, although the funds are divided at the experiment stations among many individual projects. The 110 lump-sum payments reported in fiscal year 1969 constituted 86 percent of USDA support for research and development and ranged in size from $12,000 to nearly $2 million, with $51.4 million attributable to Hatch Act funding, and $3.4 million to McIntire-Stennis Act funding.

Chart 9.

Federal R&D obligations to universities and colleges, by field of science and agency, FY 1969

(Dollars in millions)



a/ Includes the Office of Economic Opportunity and the Departments of Commerce, Labor, Interior and Agriculture, except where shown separately.

SOURCE: National Science Foundation (CASE).

particularly with the increased emphasis on the ecosystems approach.

In the physical sciences, DOD's estimated $110 million constituted about two-fifths of the field total as well as constituting two-fifths of DOD's R. & D. support. Other important contributors were AEC, NSF, and NASA, which together funded more than 50 percent of the $287 million field total. AEC's $61 million, although only one-fifth of the field total, constituted three-fifths of this agency's R. & D. support. Within the physical sciences, physics ranked highest with $179 million, of which 94 percent was funded by DOD, AEC, and NSF. Chemistry funding was led by HEW, whose $24 million constituted nearly one-third of the $76 million chemistry obligations. NASA's $33 million was divided somewhat more evenly among the various physical sciences, with astronomy and physics each receiving about 30 percent; "physical sciences, n.e.c.," 24 percent; and chemistry, 17 percent. When analyzing these figures, however, it should be noted that chemistry as well as physics are rather narrowly defined and that many aspects of both fields are included under life sciences. (See definitions of these fields shown in the technical notes.)

In engineering, DOD and NASA together accounted for 70 percent of the $140 million field total, with an estimated $57 million, or 41 percent, attributable to DOD alone. For NASA as well as for the Department of the Interior, engineering represented about one-third of each agency's R. & D. contribution; for DOD, about one-fifth.

Nearly $39 million of the engineering support could not be classified under any of the detailed fields, particularly by DOD and NASA which together accounted for 70 percent of the "engineering, n.e.c." funding. For all detailed fields other than chemical engineering. DOD funded between one-third and two-thirds of the total. In the three highest funded fields—electrical, mechanical, and aeronautical engineering—NASA's support ranged from 13 percent in electrical engineering to 50 percent in aeronautical engineering. The Department of Agriculture support of astronautical engineering comprised remote sensing research for agricultural use.

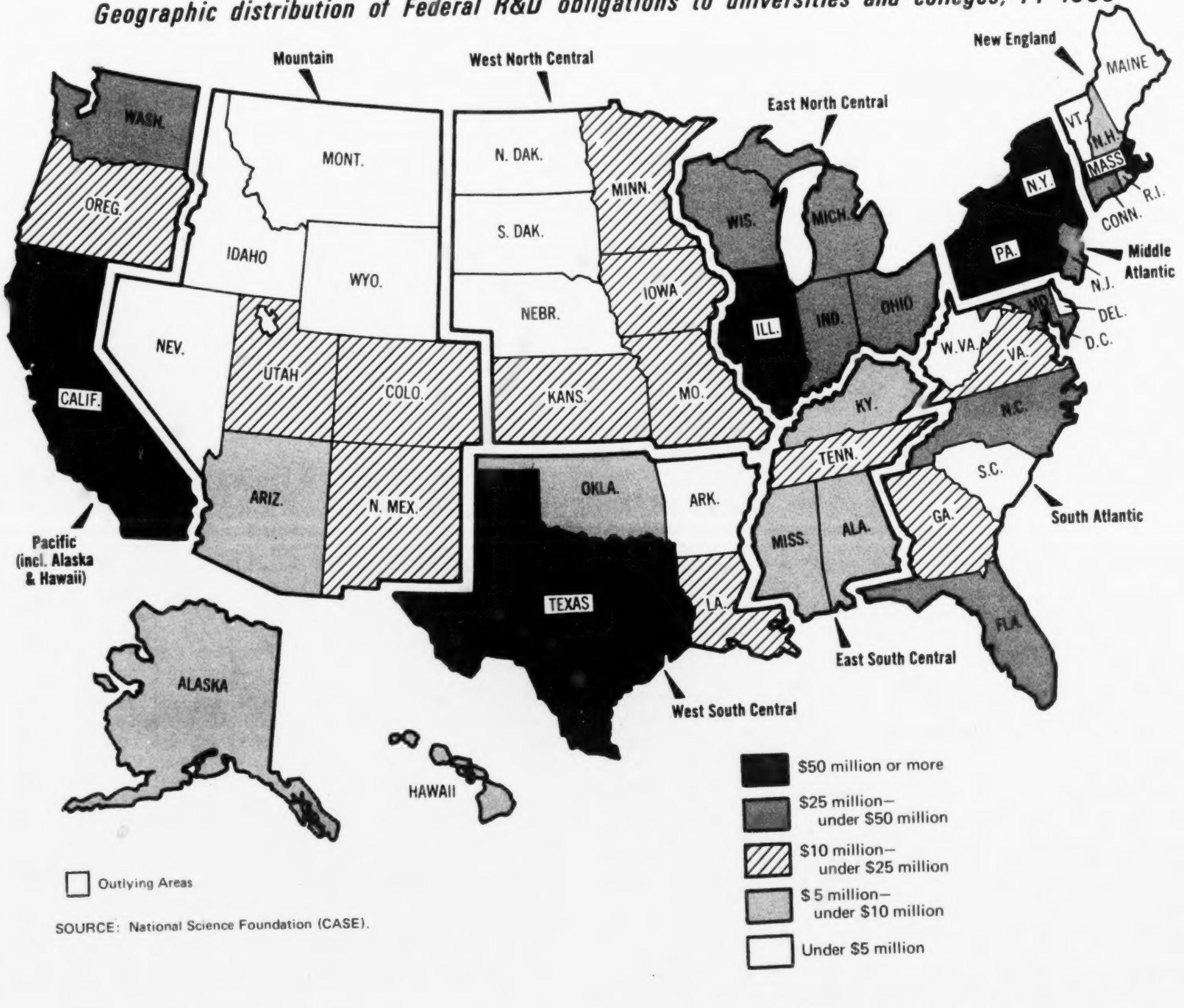
The environmental sciences support of $77 million was concentrated mainly in the atmospheric and geological sciences. In the former, DOD and NSF together contributed 72 percent of the total; in the latter, these agencies accounted for 77 percent of the funding. For these agencies, however, environmental sciences support constituted only 11 and 13 percent of their obligations for research and development, respectively. For the Department of Commerce, on the other hand, 78 percent of R. & D. funding was in the environmental sciences, and for the Department of the Interior, 22 percent.

Geographic patterns of support

Institutions in four of the nine geographic divisions were recipients of about two-thirds of the Federal academic R. & D. support. The highest ranking of the four, the Middle Atlantic division, accounted for $244 million, or 19 percent, of the total academic R. & D. support, with 12 percent of the 19 percent concentrated in New York institutions. An even greater concentration of division funding within a single State was evident in the Pacific and New England divisions: Institutions in California and Massachusetts received about three-fourths of total funding for their respective divisions. In the East North Central area, on the other hand, a much greater dispersion of funds among various States occurred, with even the highest ranking, Illinois, receiving only one-third of the $219 million division total (appendix table B–8).

For the most part, HEW support predominated in each division's funding, ranging from 39 percent in the Pacific area to 51 percent in the East South Central division. A few exceptions, however, did occur: In New England, DOD as well as HEW each accounted for 30 percent of the $185 million

Chart 10.
Geographic distribution of Federal R&D obligations to universities and colleges, FY 1969



SOURCE: National Science Foundation (CASE).

division total, with NASA and NSF contributing 18 percent and 11 percent, respectively. In the Mountain area, HEW contributed only 25 percent of the $63 million allocated to that division, with 30 percent, 13 percent, and 11 percent attributable to DOD, NSF, and NASA, respectively.

A total of 16 States, each the recipient of $25 million or more in R. & D. support, accounted for $986 million, or 76 percent of Federal research and development, with the 6 States in the $50 million-or-more category receiving $669 million, or 52 percent (chart 10). These 16 States included 67 of the 100 institutions receiving the highest R. & D. support (appendix table B–9). California, the highest ranking of the States, had 10 institutions listed among the top 100; these 10 institutions received 96 percent of that State's $182 million in Federal R. & D. support. In second-ranking New York, the 12 institutions included among the top 100 received $136 million, or 88 percent of the State total. In fact, with the exception of Texas, the institutions within these 16 States included among the top-ranking 100 received at least 80 percent of their respective State R. & D. funding and, as in the case of institutions in five States—Connecticut, Indiana, Maryland, Michigan, and Washington—upwards of 95 percent of R. & D. support in their respective States.

Institutional patterns of support

A total of 532 institutions were reported by one or more of the Federal agencies as recipients of R. & D. support. This figure includes not only the institutions themselves, but also the central systems offices to which funds were officially assigned, even though the work was actually performed through one of the system's component institutions. Such systems office funding was at times quite substantial. For example, the University of Wisconsin system office received $3.2 million, of which $2.4 million was attributable to three Office of Economic Opportunity awards.

For 160 of the 532 institutions, funding exceeded $1 million; for 74, it exceeded $5 million. A total of $873 million, or 67 percent of R. & D. support, was concentrated among the top 50 academic institutions, with an additional $244 million, or 19 percent, going to the next 50 institutions (table 5). The single largest recipient was the Massachusetts Institute of Technology (MIT), whose $77 million in R. & D. funds were largely attributable to DOD and NASA (appendix table B–9). For Harvard University, the second-ranking institution, support came chiefly from HEW and NASA.

Overall, the 100 institutions with the highest R. & D. support received 86 percent of Federal R. & D. funding. The extent of concentration, however, differed among the agencies. AEC, NASA, and the Department of Labor channeled more than 50 percent of their funding—and DOD, just under 50 percent—to the 20 top-ranking institutions. NASA allocated nearly one-fourth of its R. & D. funds to two institutions, MIT and Harvard; DOD, 15 percent to MIT. HEW, on

TABLE 5.—*Federal R. & D. obligations to universities and colleges receiving the largest amounts, ranked in various groups, by agency, fiscal year 1969*

[Dollars in thousands]

Number of institutions (ranked in order of R. & D. obligations)	Amount	% of U.S. total	% of Ph. D. degrees in sci. & engr.	Dept. of Agric.	Atomic Energy Comm.	Dept. of Commerce	Dept. of Defense	Dept. of Health, Educ. & Welfare	Dept. of the Interior	Nat'l. Aero. and Space Admin.	Nat'l. Sci. Fdn.	Office of Econ. Opportunity	Dept. of Labor
Total, all institutions	$1, 296, 997	100. 00	100. 00	$63, 352	$103, 141	$1, 408	$271, 874	$528, 858	$19, 742	$123, 233	$175, 887	$7, 007	$2, 495
First 10	355, 454	27. 41	23. 09	5, 613	32, 091	238	102, 782	107, 761	2, 178	56, 608	45, 922	1, 509	752
Second 10	205, 363	15. 83	13. 45	3, 416	24, 133	129	27, 859	106, 608	1, 742	9, 418	31, 164	223	671
Third 10	131, 942	10. 17	10. 41	4, 560	12, 524	25	21, 585	62, 366	800	11, 258	18, 510	--------	314
Fourth 10	101, 582	7. 83	9. 99	3, 473	6, 808	370	18, 719	45, 288	1, 998	9, 776	14, 942	65	143
Fifth 10	73, 310	6. 04	5. 98	8, 534	4, 918	85	15, 180	31, 995	1, 374	5, 093	11, 067	--------	64
First 50	872, 651	67. 28	62. 92	25, 596	80, 474	847	186, 125	354, 018	8, 092	92, 153	121, 605	1, 797	1, 944
Second 50	243, 895	18. 81	23. 23	20, 104	15, 522	270	46, 561	108, 916	5, 307	15, 263	30, 998	553	401
First 100	1, 116, 546	86. 09	86. 15	45, 700	95, 996	1, 117	232, 686	462, 934	13, 399	107, 416	152, 603	2, 350	2, 345
All other	180, 451	13. 91	13. 85	17, 652	7, 145	291	39, 188	65, 924	6, 343	15, 817	23, 284	4, 657	150

SOURCE: National Science Foundation (CASE).

the other hand, showed a somewhat greater dispersion of funds, allocating one-fifth of its funds to the first 10 institutions and another fifth to the second 10. At the other end of the spectrum were the Departments of Agriculture, Commerce, and Interior, and the Office of Economic Opportunity, for which upwards of 20 percent of R. & D. support was reported for institutions not included in the top 100. It should be noted, however, that funds to "systems offices" were excluded from this top-100 ranking, a factor that might have influenced the ranking in some cases, for example, the University of Wisconsin—Madison.

In view of the need for specialized personnel to perform research, it is not surprising to find that all agencies concentrated more than 90 percent of their research funds in institutions granting graduate degrees (table 6). In general, there is a rather close correlation between the percentage of R. & D. funds received by a particular institution and the percentage of Ph. D. degrees in the sciences and engineering. Actually, for the 20 institutions receiving the highest R. & D. funding, the percentage of Federal funds received generally exceeded the percentage of Ph. D.'s granted, whereas for institutions ranked 51 to 100, the reverse was generally true.

One should bear in mind, however, that figures in this report constitute obligations rather than expenditures, and thus the dollar amount attributed to an individual institution may represent money to be spent over a period longer than 1 year, or may represent a particular phase in so-called step-funding. Nevertheless, as has been shown in a related series of reports, the general pattern of institutional support shown in appendix table B–9 has held true over a period of years, even though the relative position of institutions may have changed.[4]

TABLE 6.—*Percent distribution of Federal obligations for research and development, fiscal year 1969, to universities and colleges classified by highest degree conferred in the sciences and engineering, academic year 1967–68*

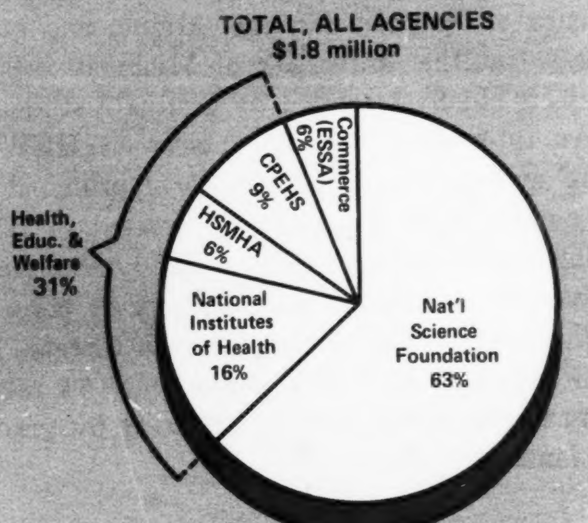
Agency	Total	Highest degree awarded		
		Ph. D.	Master's	Bachelor's
Total, all agencies	100.00	94.92	1.88	3.21
Department of Agriculture	100.00	95.70	.63	3.67
Atomic Energy Commission	100.00	98.53	.77	.70
Department of Commerce	100.00	100.00	----------	----------
Department of Defense	100.00	94.16	3.29	2.55
Department of Health, Education, and Welfare	100.00	94.37	1.09	4.54
Department of the Interior	100.00	91.49	5.49	3.02
National Aeronautics and Space Administration	100.00	96.39	1.22	2.39
National Science Foundation	100.00	94.54	3.19	2.26
Office of Economic Opportunity	100.00	96.02	3.18	.80
Department of Labor	100.00	98.28	1.72	----------

SOURCE: National Science Foundation (CASE).

Research Institutes, Seminars, or Conferences

Research institute, seminar, or conference projects are defined as those projects supporting meetings of scientists and engineers whose objective is a fuller understanding of a specific or general problem or field of study with the primary purpose of exchanging information on current research and development. This framework encompasses a wide scope of activities, ranging from meetings where funds are utilized to defray travel and accommodation costs of participants and administrative expenses, to longer term projects which include payment of salaries or stipends to participants. Excluded from the discussion in this section are institutes, seminars, or conferences aimed at the improvement of teaching, or activities

Chart 11.
Federal obligations to universities and colleges for research institutes, seminars, or conferences, by agency, FY 1969



Note: ESSA-Environmental Science Services Administration.
CPEHS-Consumer Protection and Environmental Health Service.
HSMHA-Health Services and Mental Health Administration.

SOURCE: National Science Foundation (CASE).

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[4] National Science Foundation, *Federal Support to Universities, Colleges, and Selected Nonprofit Institutions, Fiscal Year 1969* (NSF 70–27) (Washington, D.C. 20204: Superintendent of Documents, U.S. Government Printing Office, 1970).

aimed at the development of educational techniques or materials, which are separately discussed in section 3.

During fiscal year 1969, $1.8 million was obligated for research institute, seminar, and conference projects, making this the lowest funded of the eight project objectives covered by this report. Two agencies provided virtually all the Federal financial support given to such research-oriented activities: The National Science Foundation, which obligated $1.1 million, and the Department of Health, Education, and Welfare, which funded $0.6 million, together accounted for 94 percent of the total (chart 11). Within HEW, about one-half the projects were supported by the National Institutes of Health. In addition, the Department of Commerce had one award, a $100,000 contract given by the Environmental Science Services Administration (ESSA) to the University of Colorado where ESSA's primary research facility is located.

Principal level of participants

Overall, more than three-fifths of the support was for projects principally attended by university and college faculty, although groups generally were not restricted to any one category. Meetings at which graduate students predominated in number accounted for 34 percent of obligations, and those mainly for nonfaculty doctorates, 3 percent. Only one award was given for an activity attended mainly by personnel classified as "nonfaculty—other" (table 7). Two of the largest awards, one for $95,000 in political science at Bowdoin College, Maine, and one for $93,000 at the University of Michigan, were for projects chiefly attended by graduate students.

An interesting difference between HEW and NSF emerges from an analysis of principal level of participants: Although 99 percent of HEW's obligations were for projects mainly attended by university and college faculty, only 41 percent of NSF's support fell in this category. Instead, more than one-half of NSF's obligations, 54 percent, were for activities mainly attended by graduate students.

Fields of science

A field of science analysis must be restricted to projects supported by the National Science Foundation, as projects involving 72 percent of HEW funding and accounting for two-thirds of the number of awards were classified as "other sciences, not elsewhere classified," indicating projects cutting across primary-field lines as well as those not clearly definable under any of the fields listed. The majority of the remaining HEW projects were included under the "not elsewhere classified" heading within the primary fields of science.

For the National Science Foundation, 10 percent of the obligations were listed as "other sciences, not elsewhere classified." Among the other fields, projects in the social sciences predominated, accounting for $287,000, or 25 percent, of NSF funds, of which $104,000 were for two projects in political science, and $93,000 for 4 projects in anthropology. Mathematics and physical sciences (specifically physics) each accounted for slightly more than two-fifths of NSF support (appendix table B-10).

Geographic patterns of support

The Mountain area was the leading geographic division, with 19 percent of total obligations, because of the support given by both NSF and the Department of Commerce to the University of Colorado. The second-ranking East North Central division owed its place to two awards to the University of Michigan and two to Michigan State University, mainly funded by NSF. In the South Atlantic division, the third-ranking area, the University of Florida, the University of Miami, and Wake Forest College, N.C., predominated, accounting for $191,000 of the $299,000 awarded to institutions in this division (table 7).

Institutional patterns of support

Although 65 institutions participated in one or more of these projects, three-quarters of the funds were allocated to the top 20, with the three leading ones—the University of Colorado, the M. D. Anderson Hospital of the University of Texas, and the University of Wisconsin (Madison)—accounting for a total of 35 percent. Essentially, there was little overlap between the two agencies, and institutions funded by one did not receive support from the other for this type of project: Of the top 20 institutions, only 7 received support from both agencies (appendix table B-11). A somewhat greater concentration of support was shown by NSF than by HEW, with 60 percent, or

TABLE 7.—*Federal obligations to universities and colleges for research institutes, seminars, or conferences, by geographic division, principal level of participants, and agency, fiscal year 1969*

[Dollars in thousands]

Geographic division and principal level of participants	Total		Department of Health, Education, and Welfare		National Science Foundation		Department of Commerce	
	Amount	Percent distribution	Amount	Percent distribution	Amount	Percent distribution	Amount	Percent distribution
United States, total	$1,805	100.00	$570	100.00	$1,135	100.00	$100	100.00
University and college faculty	1,123	62.22	562	98.60	461	40.62	100	100.00
Nonfaculty—doctorates	54	2.99	8	1.40	46	4.05	-----	-----
Nonfaculty—other	11	.61	-----	-----	11	.97	-----	-----
Graduate students	617	34.18	-----	-----	617	54.36	-----	-----
New England	188	10.42	18	3.16	170	14.98	-----	-----
University and college faculty	35	1.94	18	3.16	17	1.50	-----	-----
Nonfaculty—doctorates	-----	-----	-----	-----	-----	-----	-----	-----
Nonfaculty—other	-----	-----	-----	-----	-----	-----	-----	-----
Graduate students	153	8.48	-----	-----	153	13.48	-----	-----
Middle Atlantic	164	9.09	50	8.77	114	10.04	-----	-----
University and college faculty	117	6.48	50	8.77	67	5.90	-----	-----
Nonfaculty—doctorates	6	.33	-----	-----	6	.53	-----	-----
Nonfaculty—other	-----	-----	-----	-----	-----	-----	-----	-----
Graduate students	41	2.27	-----	-----	41	3.61	-----	-----
East North Central	336	18.61	79	13.86	257	22.64	-----	-----
University and college faculty	124	6.87	79	13.86	45	3.96	-----	-----
Nonfaculty—doctorates	25	1.39	-----	-----	25	2.20	-----	-----
Nonfaculty—other	11	.61	-----	-----	11	.97	-----	-----
Graduate students	176	9.75	-----	-----	176	15.51	-----	-----
West North Central	73	4.04	44	7.72	29	2.56	-----	-----
University and college faculty	65	3.60	44	7.72	21	1.85	-----	-----
Nonfaculty—doctorates	8	.44	-----	-----	8	.70	-----	-----
Nonfaculty—other	-----	-----	-----	-----	-----	-----	-----	-----
Graduate students	-----	-----	-----	-----	-----	-----	-----	-----
South Atlantic	299	16.57	113	19.82	186	16.39	-----	-----
University and college faculty	186	10.30	105	18.42	81	7.14	-----	-----
Nonfaculty—doctorates	15	.83	8	1.40	7	.62	-----	-----
Nonfaculty—other	-----	-----	-----	-----	-----	-----	-----	-----
Graduate students	98	5.43	-----	-----	98	8.63	-----	-----
East South Central	15	.83	7	1.23	8	.70	-----	-----
University and college faculty	15	.83	7	1.23	8	.70	-----	-----
Nonfaculty—doctorates	-----	-----	-----	-----	-----	-----	-----	-----
Nonfaculty—other	-----	-----	-----	-----	-----	-----	-----	-----
Graduate students	-----	-----	-----	-----	-----	-----	-----	-----
West South Central	230	12.74	165	28.95	65	5.73	-----	-----
University and college faculty	218	12.08	165	28.95	53	4.67	-----	-----
Nonfaculty—doctorates	-----	-----	-----	-----	-----	-----	-----	-----
Nonfaculty—other	-----	-----	-----	-----	-----	-----	-----	-----
Graduate students	12	.66	-----	-----	12	1.06	-----	-----
Mountain	350	19.39	-----	-----	250	22.03	100	100.00
University and college faculty	255	14.13	-----	-----	155	13.66	100	100.00
Nonfaculty—doctorates	-----	-----	-----	-----	-----	-----	-----	-----
Nonfaculty—other	-----	-----	-----	-----	-----	-----	-----	-----
Graduate students	95	5.26	-----	-----	95	8.37	-----	-----
Pacific	133	7.37	77	13.51	56	4.93	-----	-----
University and college faculty	91	5.04	77	13.51	14	1.23	-----	-----
Nonfaculty—doctorates	-----	-----	-----	-----	-----	-----	-----	-----
Nonfaculty—other	-----	-----	-----	-----	-----	-----	-----	-----
Graduate students	42	2.32	-----	-----	42	3.70	-----	-----
Outlying areas [1]	17	.94	17	2.98	-----	-----	-----	-----
University and college faculty	17	.94	17	2.98	-----	-----	-----	-----
Nonfaculty—doctorates	-----	-----	-----	-----	-----	-----	-----	-----
Nonfaculty—other	-----	-----	-----	-----	-----	-----	-----	-----
Graduate students	-----	-----	-----	-----	-----	-----	-----	-----

[1] Includes Puerto Rico, Virgin Islands, and Guam. The amounts to the Virgin Islands and Guam were a small fraction of the total.

SOURCE: National Science Foundation (CASE).

TABLE 8.—*Federal obligations for research institutes, seminars, or conferences to universities and colleges receiving the largest amounts, ranked in various groups, by agency, fiscal year 1969*

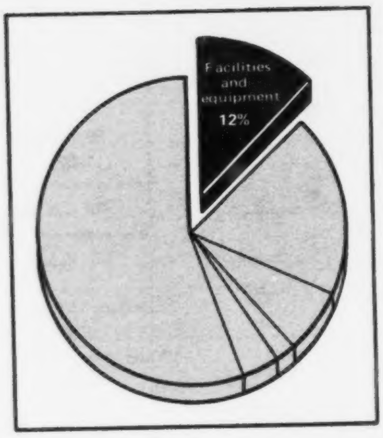
[Dollars in thousands]

Number of institutions (ranked in order of research institute, seminar, or conference obligations)	Total		Department of Commerce		Department of Health, Education, and Welfare		National Science Foundation	
	Amount	Percent distribution	Amount	Percent distribution	Amount	Percent distribution	Amount	Percent distribution
Total, all institutions	$1, 805	100. 00	$100	100. 00	$570	100. 00	$1, 135	100. 00
First 10	1, 022	56. 62	100	100. 00	244	42. 81	678	59. 74
Second 10	363	20. 11	----------	----------	159	27. 89	204	17. 97
Third 10	185	10. 25	----------	----------	77	13. 51	108	9. 52
Fourth 10	102	5. 65	----------	----------	40	7. 02	62	5. 46
Fifth 10	73	4. 04	----------	----------	29	5. 09	44	3. 88
First 50	1, 745	96. 68	100	100 00	549	96. 32	1, 096	96. 56
All other [1]	60	3. 32	----------	----------	21	3. 68	39	3. 44

[1] Represents 15 institutions. SOURCE: National Science Foundation (CASE).

$678,000 of NSF's $1.1 million allocated to the first 10 institutions, whereas these 10 institutions received only 43 percent, or $244,000, of HEW's support (table 8).

Section 2. Facilities and Equipment



DATA SHOWN in this section are concerned with the level of funding provided by Federal agencies to universities and colleges for the construction and operation of science facilities and equipment. Federal obligations for projects sponsored in this category totaled $275 million during fiscal year 1969, 12 percent of Federal obligations for all academic science activities.

For the purpose of this study, obligations for facilities and equipment are defined to include funds designated for the construction and operation of classrooms and laboratories, libraries, teaching and training equipment, research laboratories and equipment, computer facilities, hospitals and medical facilities, and all "other" facilities related to science and engineering activities that do not come under any of the foregoing categories.

The Department of Health, Education, and Welfare obligated $229 million for academic science facilities and equipment in fiscal year 1969. Eighty-three percent of the HEW total was supplied by the National Institutes of Health and the Office of Education for facilities not directly related to research projects and only 9 percent for facilities supporting research activities. By comparison, the National Science Foundation's obligations for nonresearch facilities and equipment were less than one-half the amount allocated to research facilities and equipment. NSF's total obligations for academic science facilities comprised 12 percent of the Federal total. Three other agencies, Atomic Energy Commission, Department of Agriculture, and National Aeronautics and Space Administration, reported obligations for science facilities and equipment, of which only AEC funded facilities that supported activities other than research and development.

More than five-sixths of the $275 million obligated for science facilities and equipment was designated as construction funds, primarily for the construction of classrooms and laboratories, supported almost entirely by HEW (table 9). The remainder, some $37 million, was awarded to institutions in support of the operating costs of existing facilities and equipment. Basic operating funds for facilities supporting more than one type of activity received $19 million, while the specialized areas of teaching and training equipment and computers accounted for most of the rest.

Fields of Science

As facilities and equipment generally serve more than one particular field of science, most of the projects in this category were not attributable to any one field. As a result, "other sciences, n.e.c." accounted for $168 million, three-fifths of the total (appendix table B–12). The remainder, however, was obligated for specialized facilities and equipment for which the field of science could be identified. When compared to total academic science obligations and to R. & D. funds, the percentages represented by facilities and equipment in each of

TABLE 9.—*Federal obligations to universities and colleges for facilities and equipment, by type of facility, purpose of funds, and agency, fiscal year 1969*

[Dollars in thousands]

Type of facility and purpose of funds	Total, all agencies	Department of Agriculture	Atomic Energy Commission	Department of Health, Education, and Welfare			National Aeronautics and Space Administration	National Science Foundation
				Total	National Institutes of Health	Office of Education		
Total, all facilities	$274,798	$1,171	$12,338	$229,460	$149,395	$80,065	$11	$31,818
Construction	237,455	1,171	12,042	202,192	129,320	72,872		22,050
Basic operations	37,343		296	27,268	20,075	7,193	11	9,768
Research laboratories, total	30,687	1,171	2,300	21,059	20,659	400		6,157
Construction	28,990	1,171	2,300	19,409	19,009	400		6,110
Basic operations	1,697			1,650	1,650			47
Classrooms and laboratories, total	176,313		30	176,283	109,062	67,221		
Construction	176,313		30	176,283	109,062	67,221		
Basic operations								
Library, total	6,500			6,500	1,249	5,251		
Construction	6,500			6,500	1,249	5,251		
Basic operations								
Research equipment, total	13,063		7,993				11	5,059
Construction	10,263		7,993					2,270
Basic operations	2,800						11	2,789
Teaching and training equipment, total	13,585		1,706	7,193		7,193		4,686
Construction	6,096		1,410					4,686
Basic operations	7,489		296	7,193		7,193		
Computers and facilities, total	15,253			7,717	7,717			7,536
Construction	7,536							7,536
Basic operations	7,717			7,717	7,717			
Hospital and medical facilities, total	309		309					
Construction	309		309					
Basic operations								
Other facilities and equipment, total	19,088			10,708	10,708			8,380
Construction	1,448							1,448
Basic operations	17,640			10,708	10,708			6,932

SOURCE: National Science Foundation(CASE)

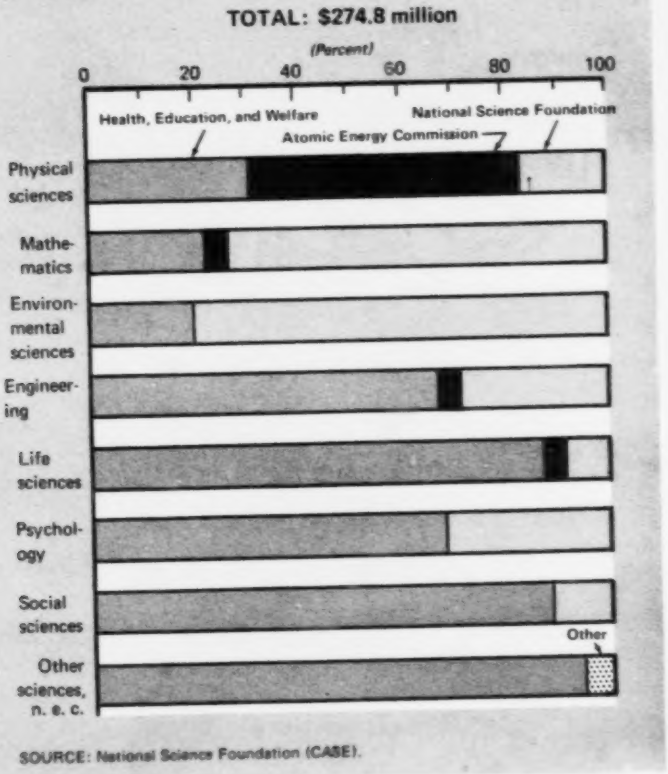
the specific fields of science are lower, except for the social sciences. Only NSF and the Office of Education sponsored facilities projects in all of the major fields of science.

Federal agencies provided more than $47 million for the construction, acquisition, or operation of facilities and equipment supporting research, education, and other science activities in the life sciences. HEW supplied $41 million of this total, with NIH and OE accounting for $33 million and $8 million, respectively. All of the NIH life science funds were reported for projects classified as clinical medicine. Funds for NSF-sponsored facilities and equipment projects in the life sciences totaled $4 million, all of which were classified as "life sciences, n.e.c." (chart 12).

Facilities and equipment in support of the physical sciences received $19 million in 1969. Among the various disciplines within this field of science, physics accounted for $13 million, most of which was obligated by AEC. Funds for more than one-half of the support for chemistry were supplied by OE.

Chart 12.

Federal obligations for academic science facilities and equipment, by field of science and agency, FY 1969



SOURCE: National Science Foundation (CASE).

Obligations for projects in the environmental sciences totaled $13 million, including $9 million for oceanography from NSF. Facilities supporting the social sciences received $11 million, primarily from the Office of Education.

Research Facilities

Awards totaling $44 million, constituting 16 percent of total Federal academic science facilities and equipment support, were made during 1969 specifically to strengthen research capabilities of academic institutions.[5] Of this, $31 million was obligated for research laboratories and $13 million for research equipment.[6]

These activities encompassed construction and remodeling of laboratories and other research facilities, as well as purchase and repairs or improvement of specialized equipment in support of research. Most of the funds were used for construction, renovation, or acquisition of facilities and equipment—94 percent of laboratory funds and 79 percent of equipment funds. With the exception of one $47,000 NSF award, basic operating costs of research laboratories were funded by the National Institutes of Health, whereas virtually all operations of research equipment were supported by NSF.

A total of 104 academic institutions received support for research facilities, headed by the University of Massachusetts with a medical science building construction award of $4.9 million from HEW. Forty-two of the recipient institutions received support for both research laboratories and research equipment, while 31 had obligations only for research laboratories and another 31 for research equipment. The influence of HEW funding resulted in more than one-half of all research facilities support going to 10 institutions; other agencies showed a somewhat greater dispersion of funds. Only the first 25 universities and colleges, however, received more than $500,000 in support; the lowest ranking 16 received $20,000 or less.

Geographic Patterns of Support

Institutions in the Middle Atlantic division were the leading recipients of Federal obligations for science facilities and equipment with a total of $71 million, of which HEW provided $65 million. The National Institutes of Health obligated more than one-third of its total in these States. This division accounted for slightly more than one-fourth of total Federal support for facilities and equipment (appendix table B–13).

Institutions which have major medical school facilities played an important role in the geographic distribution of Federal support. Most of the funds reported by NIH were obligated to these universities and colleges, in support of either research or training. The three States comprising the Middle Atlantic division received the largest share of Federal academic science facilities and equipment funds; one out of five medical schools is located in these three States. Nine institutions with major medical schools ranked within the first 90 largest recipients of facilities and equipment obligations, with a total of $55 million. Two of the Middle Atlantic States, New Jersey and New York, ranked first and third, respectively, in total funding, accounting for $41 million and $22 million (chart 13). Massachusetts accounted for

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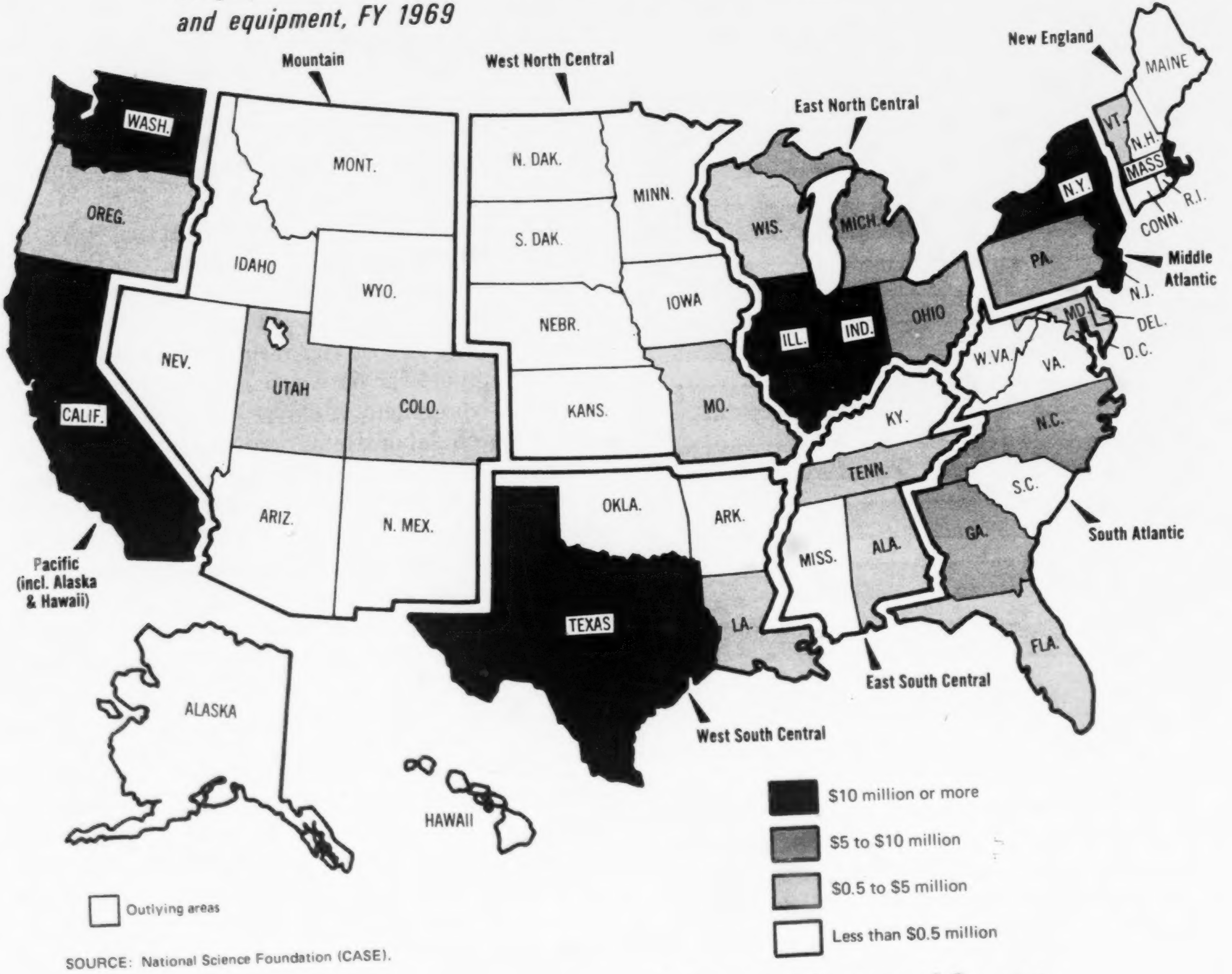
[5] In the CASE survey, the Department of Defense classifies all of its obligations to universities and colleges as research and development. Hence, it did not report anything for academic science facilities and equipment.

[6] For an explanation of the distinction between research laboratories and research equipment, see definition of type of facility, technical notes, p. 48.

Chart 13.

Geographic distribution of Federal obligations for academic science facilities and equipment, FY 1969



SOURCE: National Science Foundation (CASE).

$36 million in second place. Eight States received more than 61 percent of all Federal funds for academic science facilities and equipment; they also accounted for 73 percent of the HEW total. In all but one of the leading eight States, HEW obligations comprised more than three-fifths of each State's facilities and equipment funds. The exception was California where HEW accounted for 57 percent of the support, followed by NSF with 37 percent. California was also the only one of the first eight States in which classrooms and instructional laboratories did not account for at least one-half of the State's facilities and equipment obligations (appendix table B-14). Academic institutions with major medical facilities in these first eight States received $102 million, which was 37 percent of the total Federal obligations for academic science facilities and equipment.

Institutional Patterns of Support

There were 778 universities and colleges receiving facilities and equipment support in 1969. The 100 receiving the largest amounts represented 82 percent of the total amount of obligations (table 10). With the exception of the Department of Agriculture, these 100 accounted for the major portion of each agency's funds in this category.

The New Jersey College of Medicine and Dentistry was the largest single recipient of obligations for facilities and equipment, with projects totaling $35 million. The entire amount was obligated from NIH for construction purposes.

The 47 institutions with medical school facilities included in the top 100 recipients of facilities and equipment obligations accounted for $151 million.

TABLE 10.—*Federal obligations for facilities and equipment to the 100 universities and colleges receiving the largest amounts, by agency, fiscal year 1969*

[Dollars in thousands]

Institution (in order of facilities and equipment obligations)	State	Total, all agencies	Department of Agriculture	Atomic Energy Commission	Department of Health, Education, and Welfare	National Aeronautics and Space Administration	National Science Foundation
Total, 100 institutions		$225,432	$503	$10,373	$190,302	$11	$24,243
1. New Jersey College of Medicine and Dentistry	N.J.	35,301			35,301		
2. University of Massachusetts	Mass.	18,896	15		18,813		68
3. University of Washington	Wash.	11,439		21	9,978		1,440
4. Harvard University	Mass.	10,846		665	9,920	11	250
5. Indiana University-Indianapolis	Ind.	7,703			7,703		
6. University of Illinois-Medical Center	Ill.	5,382		10	5,372		
7. Ohio State University	Ohio	5,122		12	5,101		9
8. University of California—San Diego	Calif.	4,290					4,290
9. Albany Medical College	N.Y.	4,157			4,157		
10. Duke University	N.C.	4,084		623	2,925		536
11. Columbia University [1]	N.Y.	3,872		236	2,827		809
12. Michigan State University	Mich.	3,866	83	202	2,317		1,264
13. Massachusetts Institute of Technology	Mass.	3,350		2,144	441		765
14. California Institute of Technology	Calif.	3,249		890	1,687		672
15. University of Vermont	Vt.	3,236			3,209		27
16. University of Delaware	Del.	3,229	6		3,198		25
17. University of Wisconsin—Madison	Wis.	3,160		81	2,290		789
18. Yeshiva University	N.Y.	3,003			3,003		
19. Temple University	Pa.	2,687			2,687		
20. University of Miami	Fla.	2,342					2,342
21. University of Alabama—Birmingham	Ala.	2,323			2,318		5
22. University of Maryland	Md.	2,120	20	1,718	300		82
23. Texas A&M University	Tex.	2,088	82	36	1,856		114
24. New York University	N.Y.	1,902		20	1,821		61
25. University of Pennsylvania	Pa.	1,884		728	899		257
26. University of California—Los Angeles	Calif.	1,872		94	1,748		30
27. Vanderbilt University	Tenn.	1,832			1,832		
28. University of California—Davis	Calif.	1,809		120	1,654		35
29. Southern Illinois University	Ill.	1,770			1,755		15
30. Stanford University	Calif.	1,759			597		1,162
31. Tulane University	La.	1,739			1,714		25
32. University of Colorado	Colo.	1,591		41	1,515		35
33. University of Utah	Utah	1,509		26	1,405		78
34. University of Chicago	Ill.	1,481		433	288		760
35. Cornell University	N.Y.	1,453	15	31	731		676
36. SUNY College at Plattsburgh	N.Y.	1,327			1,327		
37. University of Michigan	Mich.	1,316		211	207		898
38. University of Missouri—Columbia	Mo.	1,308		56	1,191		61
39. Dekalb College	Ga.	1,300			1,300		
40. Princeton University	N.J.	1,283		534			749
41. University of Oregon	Oreg.	1,268		17	1,235		16
42. Portland State University	Oreg.	1,227			1,227		
43. University of Hawaii	Hawaii	1,202			632		570
44. Northwestern University	Ill.	1,178			1,162		16
45. Stevens Institute of Technology	N.J.	1,169		26	1,143		
46. Emory University	Ga.	1,162			1,162		
47. Rutgers, The State University	N.J.	1,101			1,035		66
48. University of Rhode Island	R.I.	1,073			641		432
49. University of Illinois—Urbana [2]	Ill.	1,065	20	355	250		440
49. Lehigh County Community College [2]	Pa.	1,065			1,065		
51. Washington University	Mo.	1,045			1,019		26
52. University of California—Santa Barbara	Calif.	1,041			1,000		41
53. Indiana State University	Ind.	1,033			1,030		3
54. Northeastern Illinois State College [2]	Ill.	1,025			1,025		
54. Joliet Junior College [2]	Ill.	1,025			1,025		

See footnotes at end of table.

TABLE 10.—*Federal obligations for facilities and equipment to the 100 universities and colleges receiving the largest amounts, by agency, fiscal year 1969*—Continued

[Dollars in thousands]

Institution (in order of facilities and equipment obligations)	State	Total, all agencies	Department of Agriculture	Atomic Energy Commission	Department of Health, Education, and Welfare	National Aeronautics and Space Administration	National Science Foundation
56. University of Notre Dame	Ind.	1,009	-----	196	774	-----	39
57. Montgomery College	Md.	1,007	-----	-----	1,000	-----	7
58. Northrop Institute of Technology [2]	Calif.	1,000	-----	-----	1,000	-----	-----
58. Eastern Illinois University [2]	Ill.	1,000	-----	-----	1,000	-----	-----
58. Kansas State University [2]	Kans.	1,000	-----	294	706	-----	-----
58. St. Marys Dominican College [2]	La.	1,000	-----	-----	1,000	-----	-----
62. University of Cincinnati	Ohio	963	-----	3	960	-----	-----
63. University of North Carolina—Chapel Hill	N.C.	960	-----	50	685	-----	225
64. University of California—Berkeley	Calif.	958	39	4	428	-----	487
65. Weber State College	Utah	955	-----	-----	955	-----	-----
66. University of Missouri—Kansas City	Mo.	952	-----	-----	952	-----	-----
67. Case Western Reserve University	Ohio	922	-----	-----	900	-----	22
68. Oregon State University	Oreg.	904	10	5	416	-----	473
69. University of Tennessee	Tenn.	897	17	72	766	-----	42
70. Syracuse University	N.Y.	882	-----	-----	700	-----	182
71. University of California—Santa Cruz	Calif.	854	-----	-----	850	-----	4
72. University of Virginia	Va.	853	-----	49	713	-----	91
73. North Carolina State University at Raleigh	N.C.	833	71	14	499	-----	249
74. Brown University	R.I.	824	-----	-----	600	-----	224
75. Virginia Polytechnic Institute	Va.	818	106	6	667	-----	39
76. University of Idaho	Idaho	806	-----	-----	800	-----	6
77. University of California—Irvine	Calif.	772	-----	19	600	-----	153
78. Central Texas College	Tex.	766	-----	-----	766	-----	-----
79. St. Joseph's College	Pa.	763	-----	-----	763	-----	-----
80. Albion College	Mich.	761	-----	-----	761	-----	-----
81. Middlesex County College	N. J.	755	-----	-----	755	-----	-----
82. University of Southern Alabama [2]	Ala.	750	-----	-----	750	-----	-----
82. State College at Westfield [2]	Mass.	750	-----	-----	750	-----	-----
82. Simmons College [2]	Mass.	750	-----	-----	750	-----	-----
85. Iowa State University	Iowa	742	19	-----	675	-----	48
86. Stephen F. Austin State University	Tex.	740	-----	-----	734	-----	6
87. Pace College	N.Y.	705	-----	-----	705	-----	-----
88. University of Southern California	Calif.	701	-----	-----	69	-----	632
89. University of Rochester	N.Y.	692	-----	261	330	-----	101
90. University of Kansas	Kans.	675	-----	14	204	-----	457
91. George Washington University [2]	D.C.	642	-----	-----	407	-----	235
91. Viterbo College [2]	Wis.	642	-----	-----	642	-----	-----
93. California State College	Calif.	640	-----	-----	640	-----	-----
94. Valpariso University	Ind.	636	-----	8	595	-----	33
95. University of Alabama—Tuscaloosa	Ala.	621	-----	35	159	-----	427
96. Wisconsin State University—Oshkosh	Wis.	615	-----	10	600	-----	5
97. University of Georgia	Ga.	603	-----	-----	500	-----	103
98. Olivet Nazarene College	Ill.	590	-----	-----	590	-----	-----
99. Parkland College	Ill.	589	-----	-----	575	-----	14
100. Ohio Northern University	Ohio	576	-----	3	573	-----	-----

[1] Main university only.

[2] Duplicate numbers indicate "tie" for place; e.g., same amount.

SOURCE: National Science Foundation (CASE).

That represented 67 percent of the total received by these 100 institutions.

Obligations for facilities and equipment were more widely distributed among all the recipients of academic science support than were either total academic science or R. & D. funds. The first 10 institutions in terms of academic science obligations accounted for 22 percent of academic science support and 27 percent of R. & D., compared to 14 percent of facilities and equipment funds (table 11). The top 50 represented 61 percent of academic science support and 66 percent of research and development, but only 56 percent of facilities and equipment. Institutions ranking

TABLE 11.—*Academic science obligations to universities and colleges receiving the largest amounts, ranked in various groups, compared to R. & D. obligations and facilities and equipment obligations, fiscal year 1969*

Number of institutions (ranked in order of academic science obligations)	Percent of academic science obligations	Percent of R. & D. obligations	Percent of facilities and equipment obligations
Total, all institutions	100.00	100.00	100.00
First 10	21.94	27.21	14.42
Second 10	14.61	14.93	18.76
Third 10	10.08	9.11	13.28
Fourth 10	8.18	8.92	4.42
Fifth 10	6.11	5.61	5.34
First 50	60.93	65.78	56.22
Second 50	19.88	19.52	16.85
First 100	80.81	85.30	73.07
All other	19.19	14.70	26.93

SOURCE: National Science Foundation (CASE).

below the first 100 represented 27 percent of facilities and equipment support, but 19 percent of academic science and 15 percent of research and development.

Among the institutions that received Federal funds for science facilities, the degree of concentration of facilities funds was greater than evidenced in other types of activities (table 12). For example, while the first 50 institutions accounted for two-thirds of facilities support, they received about one-half of the funds reported for both total academic science and R. & D. support. The institutions ranking below the first 100 represented 18 percent of facilities and equipment obligations but over one-third of both total academic science and R. & D. support.

TABLE 12.—*Facilities and equipment obligations to universities and colleges receiving the largest amounts, ranked in various groups compared to academic science obligations and R. & D. obligations, fiscal year 1969*

Number of institutions (ranked in order of facilities and equipment obligations)	Percent of facilities and equipment obligations	Percent of academic science obligations	Percent of R. & D. obligations
Total, all institutions	100.00	100.00	100.00
First 10	39.02	12.56	9.74
Second 10	11.64	11.98	14.53
Third 10	7.04	10.21	11.48
Fourth 10	5.21	8.91	10.10
Fifth 10	4.19	5.01	5.43
First 50	67.10	48.67	51.28
Second 50	14.94	16.10	14.83
First 100	82.04	64.77	66.12
All other	17.96	35.23	33.88

SOURCE: National Science Foundation (CASE).

Section 3. Science Education

IN FISCAL YEAR 1969 more than $643 million was allocated by the Federal Government for science education. This sum represented 28 percent of the academic science total and reflects the Nation's continuing commitment to education in the sciences. Chart 14 summarizes science education activities by category of support, agency sponsorship, and field of science. Obligations to universities and colleges for these activities, principally by the Department of Health, Education, and Welfare and the National Science Foundation, supported a broad range of science education efforts. These efforts are educational in that they provide funds for: (1) Training individuals in various fields of scientific endeavor; (2) strengthening institutional capabilities for science education; and (3) upgrading the quality of learning in the sciences through improved science curriculums and instruction. Since programs under manpower development, educational institutes, and the development of educational techniques and materials have education as a primary purpose, they directly affect the science education process. In addition, programs under the category of general support for science have as an objective the maintenance and improvement of institutional resources for science education *and* research.

In addition to the four specific types of activity classified under the functional category of science education, other academic science activities can be considered educational in nature. For example, training opportunities are provided through the research grants at institutions of higher education which support a considerable number of research assistants, principally graduate students. Furthermore, research and development is in itself educational, since it increases the Nation's store of scientific knowledge. Funds for educational activities were also included under facilities and equipment.

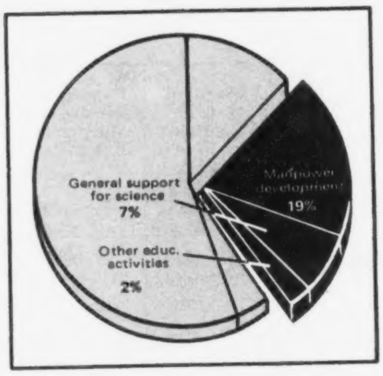
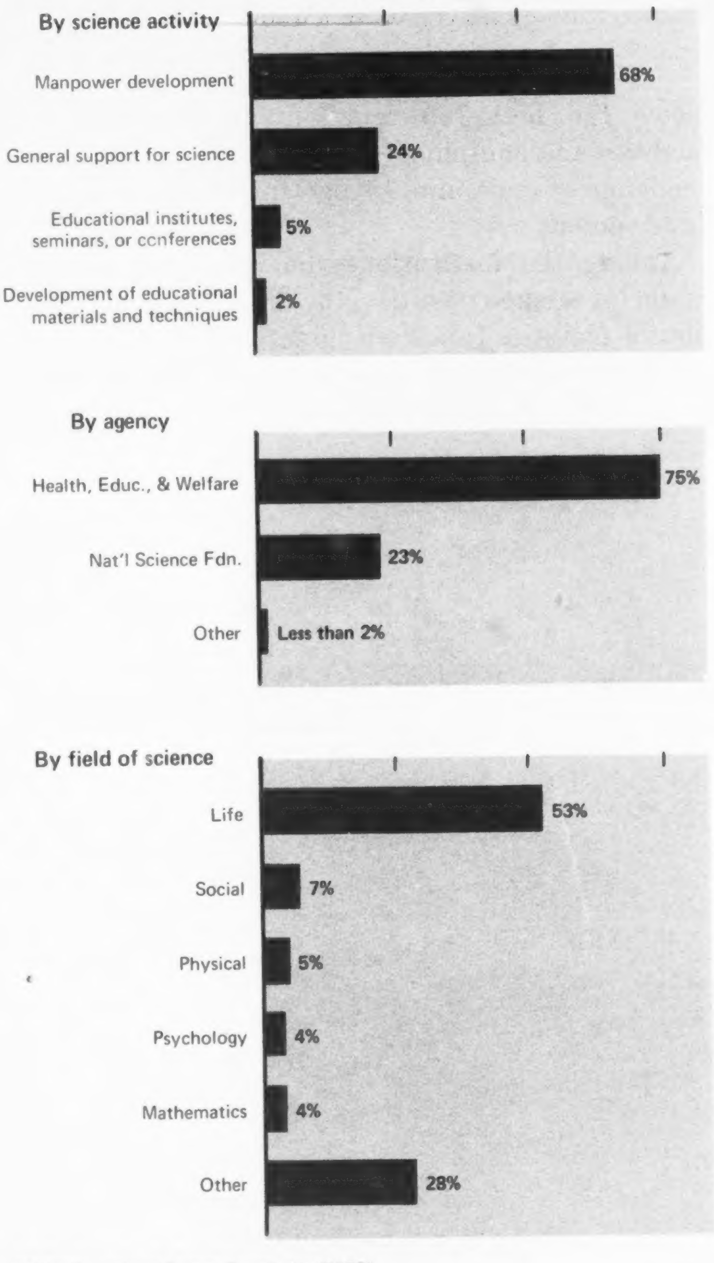


Chart 14.
Distribution of Federal obligations for science education to universities and colleges, FY 1969

Total: $643.7 million



SOURCE: National Science Foundation (CASE).

Of the $275 million total for facilities and equipment, $176 million was allocated for instructional classrooms and laboratories, $14 million for teaching and training equipment, and $7 million for libraries. The sum of $196 million for educational purposes represented a significant proportion, 71 percent, of the total funds for facilities and equipment. These activities under research and development and facilities and equipment which further science education are discussed in greater detail in sections 1 and 2.

As shown in chart 14, HEW funds comprised 75 percent, or $486 million, of the total for science education. Of this amount, 77 percent went to manpower development and 22 percent to general support for science. In contrast, NSF's science education funds were more widely distributed among the various categories of support (chart 15). NSF's educational obligations in the sciences were allocated as follows: Manpower development, 36 percent; general support for science, 33 percent; educational institutes, 24 percent; and development of educational techniques and materials, 7 percent. The National Science Foundation was the predominant source of funding for educational institutes and the development of educational techniques. The relatively high proportions of NSF support in these two categories reflect the Foundation's responsibility for the growth of the Nation's science capabilities, not just through the support of research, but through improved education in the sciences.

Also providing science education support were the Atomic Energy Commission and the National Aeronautics and Space Administration, both of which directed their primary effort to manpower development activities. By comparison, the Office of Economic Opportunity reported all of its science education obligations under the development of educational techniques and materials.

The largest proportion of Federal funds for these four educational categories was awarded to the life sciences. This predominance of life science support is due mainly to HEW's manpower development and general support for science programs. In terms of individual agency funding patterns among the major fields of science, particularly NSF, a different pattern emerges. NSF's science education obligations among the major fields were largest in the physical sciences, followed by mathematics, life sciences, and engineering. Although the social sciences and psychology were

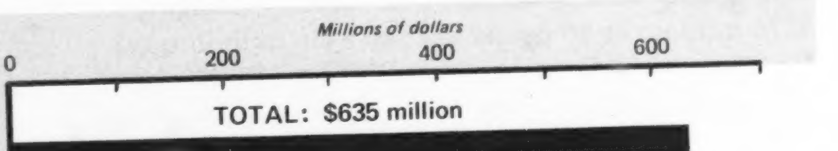


Chart 15.
Obligations by the Department of Health, Education, and Welfare and the National Science Foundation for science education, by category of support, FY 1969

SOURCE: National Science Foundation (CASE).

not among the highest ranking fields for NSF, they ranked second and fourth, respectively, for science education as a whole. The ranking positions of the social sciences and psychology in the overall pattern is primarily attributable to HEW support in these fields.

The remainder of this section analyzes the individual categories of science education support by agency sponsorship, field of science, geographic distribution, and institutional patterns.

Manpower Development

Federal obligations for manpower development to institutions of higher education totaled $436 million in fiscal year 1969—19 percent of total academic science funding. This supportive effort by the Federal Government seeks to provide training opportunities mostly through fellowships and traineeships for individuals at various educational levels. The purpose is to maintain well-trained scientific manpower as well as to encourage individuals in their pursuit of scientific knowledge and experience.

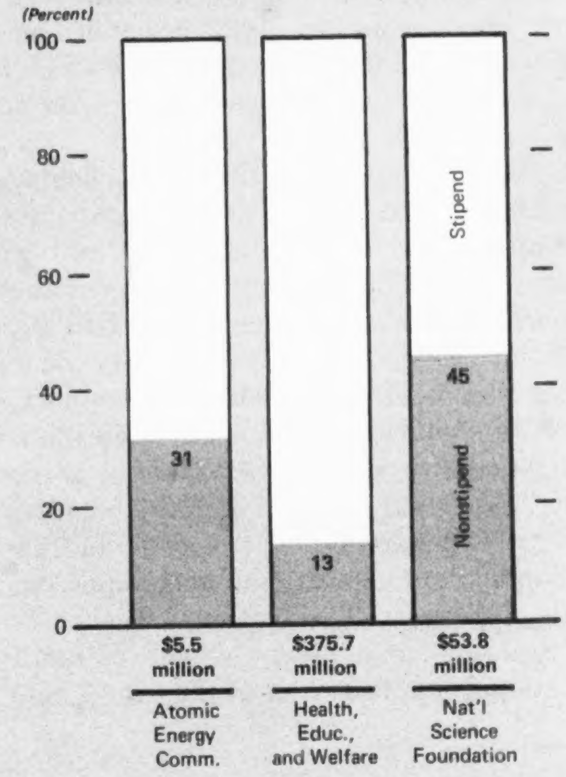
The primary source of funds for manpower development was the Department of Health, Education, and Welfare. This agency obligated $376 million, or 86 percent of the $436 million total for manpower development activities. HEW support stems mainly from the medical and health-related fellowship and training programs of the National Institutes of Health (NIH) which accounted for well over one-half of the HEW total. An additional 26 percent of HEW funds was provided by the Health Services and Mental Health Administration (HSMHA).

The National Science Foundation obligated the second largest amount of funds for manpower development. NSF obligations in this category of support totaled $54 million, or 12 percent, of total manpower development obligations. NSF funds supported a broad spectrum of manpower activities which included fellowships (predoctoral, postdoctoral, and college faculty), graduate traineeships, and research participation for college teachers and undergraduate students. In addition, precollege students received support through NSF's Student Science Training Program.

Also providing funds for manpower development were the Atomic Energy Commission and the National Aeronautics and Space Administration. NASA's support at the predoctoral and postdoctoral levels was provided under its Sustaining University Program.

Chart 16.

Nonstipend payments to universities and colleges as a percent of an agency's manpower development obligations, FY 1969



SOURCE: National Science Foundation (CASE).

With the exception of the Atomic Energy Commission, manpower development obligations comprised the second largest category of support for each of these agencies, accounting for as much as 30 percent of the academic science obligations reported by HEW.

The $436 million total for manpower development included funds for (1) the direct support (stipend) of the individual recipient of the fellowship or traineeship and (2) institutional support (nonstipend). The nonstipend payment covers tuition and fees for the individual recipient and other cost-of-education allowances for the institution. These cost-of-education allowances as part of the fellowship and traineeship grants are designed to strengthen an institution's graduate science program. Chart 16 shows nonstipend payments as a percent of an agency's total manpower development obligations.[7] In comparison to the other agencies, NSF's nonstipend payments comprised a substantially higher proportion of its total manpower development funding.

Among the sponsoring agencies, there were considerable differences in the average length of manpower development project and in the type of participant supported.[8] For example, 95 percent of the Atomic Energy Commission's manpower development funds and 91 percent of the National Science Foundation's supported full-time participants. Both agencies reported an average project length of 10 months. However, the Department of Health, Education, and Welfare with a 32-month average project length directed 60 percent of its obligations to projects supporting a combination of both full-time and part-time participants and less than 40 percent to projects supporting only full-time participants. These differences are due to the relative emphasis, in terms of support, placed on each of the agency's manpower development programs. HEW support is given primarily through NIH training grants which are awarded to institutions for a period of 5 years and individuals receiving support under such grants are not required to pursue their training on a full-time basis. On the other hand, proportionately more of AEC's and NSF's manpower development support is directed toward 9- or 12-month programs (fellowships and traineeships) which require full-time study or research.

Fields of science

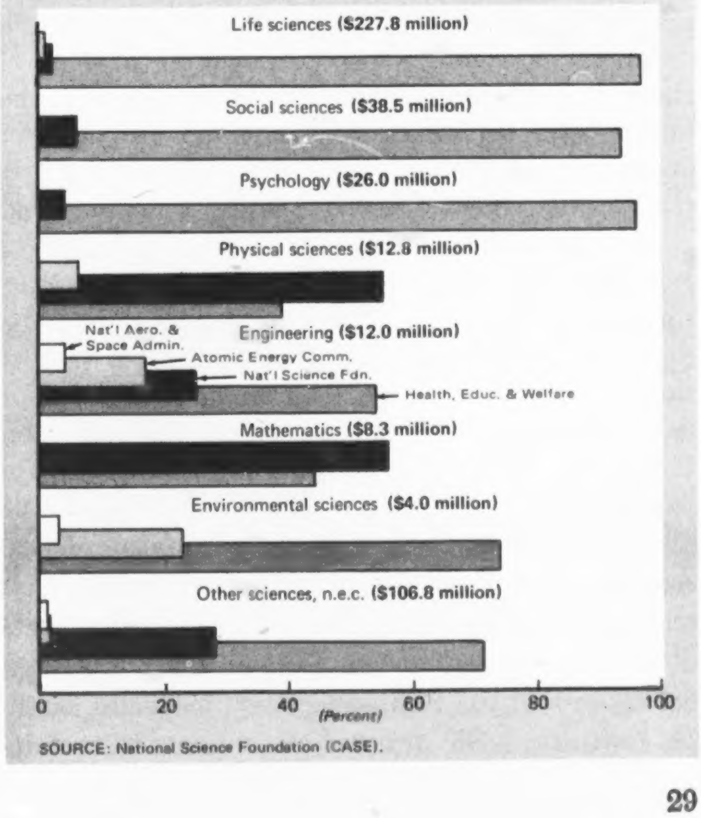
Manpower development obligations in the life sciences totaled $228 million—over one-half of the $436 million total for all fields. (See chart 17 and appendix table B–15.) Within this field, clinical medicine alone accounted for 65 percent of the total. The large share of manpower development funds in the life sciences and, in turn, clinical medicine results mainly from two operating agencies within the Department of Health, Education, and Welfare—the National Institutes of Health (NIH) and the Health Services and Mental Health Administration (HSMHA). Of HEW's total of $221 million in the life sciences, $165 million was supplied by NIH and $50 million by HSMHA. Furthermore, obligations in clinical medicine comprised 59 percent of NIH's obligations in the life sciences and 91 percent of HSMHA's.

Even though the amounts allocated by the Atomic Energy Commission and National Science Foundation to the life sciences were small in comparison to HEW, they represented a substantial proportion of their total manpower development obligations. The life sciences ranked first in receipt of AEC funds, accounting for 39 percent of this agency's manpower support. Also, one-fifth of NSF's major field obligations supported the life science discipline with the largest share directed to the biological sciences.

Obligations for which the field was unspecified totaled $107 million, almost one-fourth of the total for manpower development. This concentration is mainly attributable to HEW and NSF with each directing 20 percent and 56 percent, respectively, of their total manpower development funds to the "other sciences, n.e.c." category. The entire $58 million obligated by the Office of Education for manpower development programs was in this category. The "other sciences, n.e.c." category included not only programs which were

Chart 17.
Distribution of manpower development obligations within each field of science, by agency, FY 1969

TOTAL: $436.3 million



SOURCE: National Science Foundation (CASE).

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[7] A breakdown of NASA's fiscal year 1969 manpower development obligations into stipend and nonstipend payments was not available in time for inclusion in this report.

[8] For the definition of types of participants, see technical notes, p. 48.

either multidisciplinary or interdisciplinary, but also traineeship programs for which the field could not be predetermined by the sponsoring agency. Since funds for traineeships are given directly to the institution, the recipient institution determines in which department (field) students shall receive traineeships.

Next in terms of both total and HEW obligations for manpower development were the social sciences with 9 percent of the total and psychology with 6 percent. In each of these fields, HEW was the primary sponsor. Of this agency's $36 million total in the social sciences, $27 million, or 74 percent, was concentrated in sociology. Biological aspects received the largest share, 62 percent, of HEW's psychology project support.

Of the remaining fields, the physical sciences and engineering received nearly equal amounts, each comprising just under 3 percent of the total for manpower development. The major sponsors in the physical sciences were NSF and HEW, which accounted for 55 percent and 39 percent, respectively, of the field total. Of the seven specific fields of science, NSF obligated the largest proportion of its manpower development funds for projects in the physical sciences. Both NSF and HEW directed their main support within the field to chemistry which received 58 percent of NSF's physical science obligations and 92 percent of HEW's. Physics projects comprised an additional 37 percent of NSF's total for the physical sciences. HEW, NSF, and AEC were the principal supporters in the field of engineering furnishing, in order, 54 percent, 25 percent, and 17 percent of the total. Although NASA was not among the major agencies in the field, it did direct over one-third of its manpower development obligations to the support of traineeships in engineering.

Mathematics and the environmental sciences combined accounted for less than 3 percent of the total funds for this category of support. Yet the field of mathematics received the third largest share of NSF's obligations among the major fields of science. In the environmental sciences, HEW was the primary supporter, accounting for 74 percent of the field total. HEW allocated almost all of its funds in this field to "environmental sciences, n.e.c." since the principal focus of its training programs is on the health-related aspects of the environment rather than on the nonbiological aspects of the atmosphere and the solid earth. In contrast, NSF directed over four-fifths of its environmental science support to the geological sciences.

Geographic patterns of support

The distribution of Federal funds for manpower development among geographic divisions follows the general pattern for academic science, except in the New England and the South Atlantic divisions. The South Atlantic division received a greater share of manpower development funds, less of academic science; the New England division received less of manpower development funds, more of academic science.

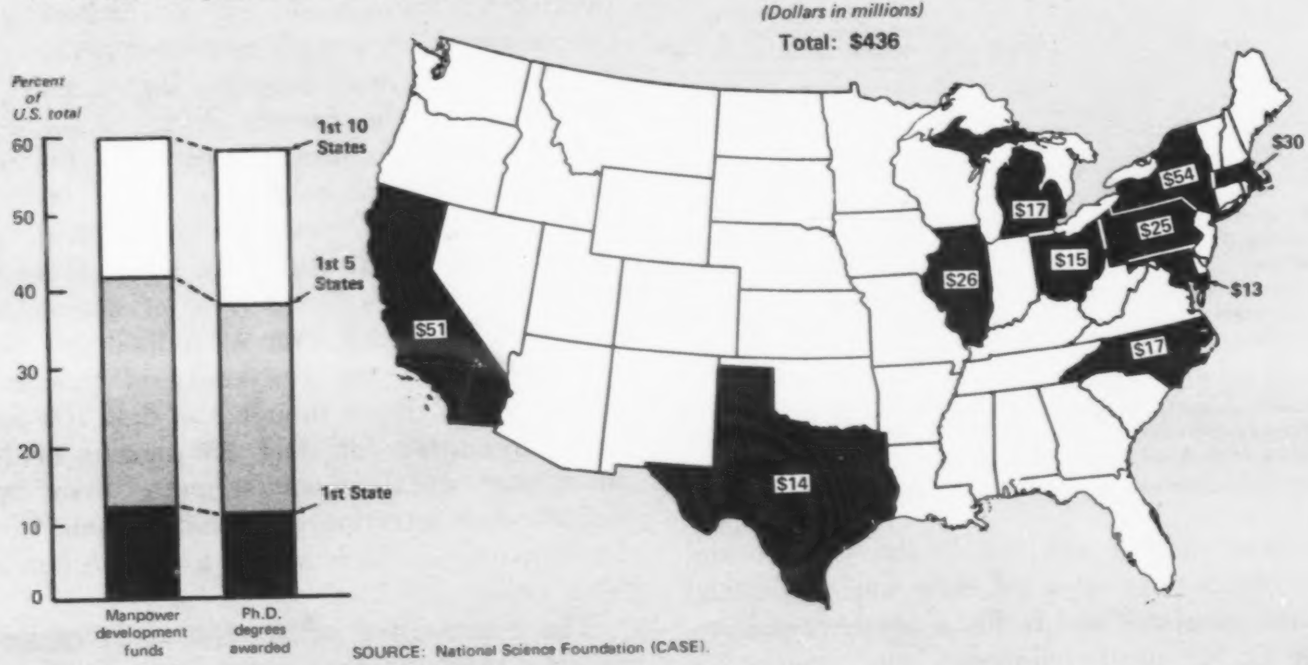
The Middle Atlantic division was the highest ranking division, receiving $85 million, almost one-fifth of total manpower development funding (appendix table B-16). States in the East North Central division accounted for an additional 18 percent of the obligations in this category of support. The next largest proportions of funds were received by the Pacific and South Atlantic divisions, comprising 16 percent and 14 percent of the total, respectively. Following these in receipt of manpower development obligations were the New England and West North Central divisions, with respective shares of 10 percent and 8 percent. Lowest were the West South Central with 6 percent, the Mountain division with 4 percent, and the East South Central with less than 4 percent.

Institutions in all geographic divisions relied heavily on support from the Department of Health, Education, and Welfare. This agency furnished over four-fifths of the support in each geographic area, except in the outlying areas which received $1 million, or 47 percent, of their obligations from the Atomic Energy Commission. The highest concentration of HEW support was reported in the South Atlantic division which received 89 percent of its support from HEW.

The distribution of manpower development obligations by the National Science Foundation to the various geographic divisions deviates from the overall pattern for all agencies, reflecting to a certain extent agency differences in type of recipient institution. Since a relatively large proportion of HEW's manpower development support is directed to medical schools, its geographic pattern and the resultant overall manpower development pattern is influenced by the location of these medical schools. As an example,

Chart 18.

Distribution of manpower development obligations to the 10 States receiving the largest amounts, FY 1969, compared to science and engineering Ph.D. degrees awarded, 1967-68, in these States



SOURCE: National Science Foundation (CASE).

the $75 million obligated by HEW in the Middle Atlantic division—the leading division in terms of both total agency support and HEW support—is actually a reflection of obligations to institutions in New York and Pennsylvania which together received $71 million, or 19 percent, of HEW's manpower development funds. Furthermore, these two States account for 19 percent of the Nation's total number of medical schools. By comparison, distribution of NSF support is not as geographically limited.

The East North Central and Pacific divisions were the leading recipients of NSF support with obligations to universities and colleges in these divisions totaling $11 million and $10 million, respectively. Institutions in California led other States in receipt of NSF support with $8 million—15 percent of NSF's total support. This is in contrast to New York's position as leading recipient of total manpower development support.

Among individual States, funds for manpower development programs to academic institutions ranged from $54 million in New York to less than $200,000 in Idaho. Universities and colleges located in 10 States accounted for nearly 60 percent, or $262 million, of the total obligations for manpower development. This high level of concentration of manpower development funding in these 10 States closely parallels the distribution of doctorate degrees in science and engineering by institutions in these States (chart 18). Thus, institutions in these 10 States not only received 60 percent of the total obligations for this activity, but also awarded 58 percent of all doctorate degrees in science and engineering.

Institutional patterns of support

The $436 million obligated in 1969 for manpower development was distributed to 485 universities and colleges.[9] Of this total, $413 million was granted to institutions awarding doctoral degrees in the sciences and engineering, including medical and dental doctorates. In addition to receiving 95 percent of the total support for manpower development, the universities and colleges conferring the doctorate as the highest degree received at least 92 percent of each agency's manpower development obligations and over 97 percent of the Atomic Energy Commission's obligations (table 13). The close relationship that exists between manpower development support

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[9] In addition, 11 administrative offices of systems received Federal obligations for manpower development.

TABLE 13.—*Federal obligations for manpower development, fiscal year 1969, to universities and colleges classified by highest degree conferred in the sciences and engineering, academic year 1967–68*

[Dollars in thousands]

Agency	Total	Institutions classified by highest degree awarded in the sciences and engineering, 1967–68		
		Ph. D [1]	Master's	Bachelor's or below
Total, all agencies	$436, 270	$412, 858	$7, 275	$16, 137
Atomic Energy Commission	5, 506	5, 356	81	69
Department of Health, Education, and Welfare	375, 655	355, 941	4, 984	14, 730
National Aeronautics and Space Administration	1, 264	1, 164	88	12
National Science Foundation	53, 845	50, 397	2, 122	1, 326

[1] Includes M.D. and D.D.S. degrees. Also includes manpower development obligations to central systems where at least one institution awarded the Ph. D. in the sciences and engineering in 1967–68.

SOURCE: National Science Foundation (CASE).

and highest degree awarded in the sciences and engineering is to be expected, since well-established graduate programs and facilities are essential prerequisities for most fellowship and traineeship awards.

Table 14 shows agency sponsorship of man power development projects to universities and colleges ranked in the top 100. It is evident from the table that the total obligations for this activity were heavily concentrated within the group of institutions that ranked in the top 100, as they received $375 million, or 86 percent of total manpower development support. Yet, in terms of individual agency funding, the distribution of obligations to the top 100 recipients varied considerably. The Department of Health, Education, and Welfare, with more than $330 million, or 88 percent of its total, obligated to the 100 top-ranking institutions, showed the highest level of concentration among the agencies providing manpower development support. By contrast, only 62 percent of the Atomic Energy Commission's manpower development funds went to the top 100 universities and colleges.

The exclusion of systems offices from the group of 100 ranking institutions was the primary factor influencing AEC's lower level of concentration, since AEC awarded over $1 million—24 percent of its total—to the University of Puerto Rico system office. Even though the first 100 institutions accounted for only 75 percent of NSF's manpower development support, there was a definite concentration of support among the first 50 institutions which received over 55 percent of NSF's obligations.

The composition of the 100 universities and colleges receiving the largest amounts for manpower development was similar to that for academic science support and R. & D. support. For example, the first 15 ranking institutions for manpower development were among the first 20 ranking institutions in terms of total academic science support and R. & D. support. In addition, 85 of the 100 leading recipients for this category of support ranked among the top 100 for total academic science support and 80 of the first 100

TABLE 14.—*Federal obligations for manpower development to the universities and colleges receiving the largest amounts, ranked in various groups, by agency, fiscal year 1969*

[Dollars in thousands]

Number of institutions (ranked in order of manpower development obligations)	Total	Atomic Energy Commission	Department of Health, Education, and Welfare	National Aeronautics and Space Administration	National Science Foundation
Total, all institutions	$436, 270	$5, 506	$375, 655	$1, 264	$53, 845
First 10	98, 104	865	87, 235	111	9, 893
Second 10	71, 978	414	65, 130	85	6, 349
Third 10	49, 491	738	42, 069	111	6, 573
Fourth 10	38, 596	292	34, 452	161	3, 691
Fifth 10	30, 577	360	26, 805	12	3, 400
First 50	288, 746	2, 669	255, 691	480	29, 906
Second 50	86, 277	765	74, 715	331	10, 466
First 100	375, 023	3, 434	330, 406	811	40, 372
All other	61, 247	2, 072	45, 249	453	13, 473

SOURCE: National Science Foundation (CASE).

institutions for research and development were within the group of 100 top-ranking universities and colleges for manpower development.

Harvard University, the leading recipient of manpower development funds, received $12 million, 83 percent of which was obligated by the Department of Health, Education, and Welfare (appendix table B–17). Of the $9 million obligated to Stanford University (ranking fifth) $2 million supported NSF programs, representing the largest share of this agency's manpower development support.

In another aspect of the distribution of support to the top 100 institutions—obligations by field of science—the life sciences with 55 percent accounted for the highest proportion of the total funds obligated to the first 100 universities (table 15). Furthermore, the amount of life science obligations ($207 million) directed to the first 100 institutions represented 91 percent of the total support for programs in this field.

Life science obligations as a percent of an institution's total obligations ranged from 99 percent for CUNY's Mt. Sinai School of Medicine to 10 percent for Syracuse University. Of the first 100 universities and colleges, only three evidenced a concentration of funds in a major field other than the life sciences. The largest proportion of manpower development obligations at these three institutions—Florida State University, Syracuse University, and the University of Connecticut—supported programs in the social sciences.

Among the ranked groups in table 15, there is considerable variation in the distribution of manpower development obligations into the various fields of science. The first 10 institutions received 28 percent of the obligations in the field of mathematics, but only 14 percent of the obligations in in the environmental sciences. Support in the latter field was concentrated within the second- and third-ranked groups of institutions, each of which received almost 20 percent of the total.

TABLE 15.—*Federal obligations for manpower development to the universities and colleges receiving the largest amounts ranked in various groups, by field of science, fiscal year 1969*

[Dollars in thousands]

Number of institutions (ranked in order of manpower development obligations)	Total	Physical sciences	Mathematics	Environmental sciences	Engineering	Life sciences	Psychology	Social sciences	Other sciences, n.e.c.
Total, all institutions:									
Amount of obligations	$436, 270	$12, 830	$8, 324	$3, 955	$12, 017	$227, 831	$25, 965	$38, 508	$106, 840
Percent of total	100. 00	100. 00	100. 00	100. 00	100. 00	100. 00	100. 00	100. 00	100. 00
First 10:									
Amount of obligations	98, 104	3, 036	2, 327	554	2, 582	58, 024	5, 312	9, 821	16, 448
Percent of total	22. 49	23. 66	27. 96	14. 01	21. 49	25. 47	20. 46	25. 50	15. 39
Second 10:									
Amount of obligations	71, 978	1, 660	1, 320	774	1, 264	42, 906	5, 430	6, 301	12, 323
Percent of total	16. 50	12. 94	15. 86	19. 57	10. 52	18. 83	20. 91	16. 36	11. 53
Third 10:									
Amount of obligations	49, 491	1, 802	779	773	1, 972	25, 389	3, 305	4, 161	11, 310
Percent of total	11. 34	14. 05	9. 36	19. 54	16. 41	11. 14	12. 73	10. 81	10. 59
Fourth 10:									
Amount of obligations	38, 596	750	386	79	805	20, 261	2, 335	2, 731	11, 249
Percent of total	8. 85	5. 85	4. 64	2. 00	6. 70	8. 89	8. 99	7. 09	10. 53
Fifth 10:									
Amount of obligations	30, 577	790	355	305	1, 059	15, 322	1, 963	1, 574	9, 209
Percent of total	7. 01	6. 16	4. 26	7. 71	8. 81	6. 73	7. 56	4. 09	8. 62
First 50:									
Amount of obligations	288, 746	8, 038	5, 167	2, 485	7, 682	161, 902	18, 345	24, 588	60, 539
Percent of total	66. 19	62. 65	62. 07	62. 83	63. 93	71. 06	70. 65	63. 85	56. 66
Second 50:									
Amount of obligations	86, 277	2, 098	1, 713	711	1, 917	44, 953	4, 005	5, 894	24, 986
Percent of total	19. 78	16. 35	20. 58	17. 98	15. 95	19. 73	15. 42	15. 31	23. 39
First 100:									
Amount of obligations	375, 023	10, 136	6, 880	3, 196	9, 599	206, 855	22, 350	30, 482	85, 525
Percent of total	85. 96	79. 00	82. 65	80. 81	79. 88	90. 79	86. 08	79. 16	80. 05
All other:									
Amount of obligations	61, 247	2, 694	1, 444	759	2, 418	20, 976	3, 615	8, 026	21, 315
Percent of total	14. 04	21. 00	17. 35	19. 19	20. 12	9. 21	13. 92	20. 84	19. 95

SOURCE: National Science Foundation (CASE).

In addition to receiving 71 percent of the obligations in both the life sciences and psychology, the first 50 institutions accounted for over 62 percent of the funds in each of the remaining fields.

General Support for Science

General support for science encompasses those projects aimed at strengthening and sustaining the scientific capabilities of universities and colleges. Support under this category is comprehensive and allows for considerable flexibility of purpose. Various agency programs are included under general support, such as the National Science Foundation's University Science Development Program and Departmental Science Development Program and the National Institutes of Health's General Research Support grants and Biomedical Sciences Support grants. In addition, other programs which are consistent with the above objective and offer institutional support, as distinct from individual project support are included under general support for science.

In fiscal year 1969, universities and colleges received $157 million for general support purposes. The Department of Health, Education, and Welfare and the National Science Foundation contributed $107 million and $50 million, respectively, to this activity. Within HEW, the National Institutes of Health was the sole contributor of funds for general support.

Fields of science

With the exception of $4 million that could not be reported under any one field, NIH obligations were concentrated in the life sciences with clinical medicine accounting for the entire $103 million obligated by NIH to this field (table 16).

The National Science Foundation's funding of general support for science showed a wider distribution of obligations among the various fields of science. The substantial portion of NSF's obligations that could not be assigned to a given field of science can be almost entirely attributed to the Foundation's University Science Development Program which does not focus on a particular area of science. Approximately 85 percent of NSF's obligations for which the field was unspecified is attributable to the funding of this program. Multidisciplinary and interdisciplinary projects under NSF's other programs accounted for the remaining unassigned funds.

TABLE 16.—*Federal obligations for general support for science to universities and colleges, by field of science and agency, fiscal year 1969*

[Dollars in thousands]

Field of science	Total	Department of Health, Education, and Welfare (National Institutes of Health)	National Science Foundation
Total, all fields	$156,989	$107,422	$49,567
Physical sciences	11,282	----------	11,282
Mathematics	2,496	----------	2,496
Environmental sciences	734	----------	734
Engineering	2,440	----------	2,440
Life sciences	106,892	103,365	3,527
Psychology	1,077	----------	1,077
Social sciences	810	----------	810
Other sciences, n.e.c	31,258	4,057	27,201

SOURCE: National Science Foundation (CASE).

NSF's obligations among the seven major fields of science totaled $22 million and were concentrated in the physical sciences which accounted for 50 percent of the funds for which a field was specified. Of the $11 million obligated to the physical sciences, 65 percent was in chemistry. Support for projects in the remaining fields ranged from $4 million for the life sciences to less than $1 million for the environmental sciences. Within each of these fields, obligations for the most part were not directed to a specific discipline within the field, but were in the "not elsewhere classified" category.

Geographic patterns of support

The largest proportion of funds for general support for science was obligated to universities and colleges in the Middle Atlantic division (table 17). Institutions in New York and Pennsylvania together received $32 million, 95 percent of the $33 million total for this division. The Middle Atlantic division was the major recipient of both NIH and NSF support, accounting for 18 percent and 28 percent, respectively, of their general support funds.

Nearly equal amounts—$23 million—were directed to the East North Central and South Atlantic divisions which ranked second and third in terms of NIH support and, therefore, total general support obligations. By contrast, the East North Central division ranked only sixth in receipt of NSF support and the South Atlantic

TABLE 17.—*Federal obligations for general support for science to universities and colleges, by geographic division, State, and agency, fiscal year 1969*

[Dollars in thousands]

Division and State	Total		Department of Health, Education, and Welfare (National Institutes of Health)		National Science Foundation	
	Amount	Percent distribution	Amount	Percent distribution	Amount	Percent distribution
United States, total	$156, 989	100. 00	$107, 422	100. 00	$49, 567	100. 00
New England	9, 591	6. 11	7, 733	7. 20	1, 858	3. 75
Maine	----------	----------	----------	----------	----------	----------
New Hampshire	639	. 41	594	. 55	45	. 09
Vermont	925	. 59	773	. 72	152	. 31
Massachusetts	5, 591	3. 56	4, 784	4. 45	807	1. 63
Rhode Island	956	. 61	223	. 21	733	1. 48
Connecticut	1, 480	. 94	1, 359	1. 27	121	. 24
Middle Atlantic	33, 179	21. 13	19, 378	18. 04	13, 801	27. 84
New York	19, 166	12. 21	10, 881	10. 13	8, 285	16. 71
New Jersey	1, 511	. 96	1, 104	1. 03	407	. 82
Pennsylvania	12, 502	7. 96	7, 393	6. 88	5, 109	10. 31
East North Central	23, 369	14. 89	17, 959	16. 72	5, 410	10. 91
Ohio	6, 117	3. 90	4, 375	4. 07	1, 742	3. 51
Indiana	2, 317	1. 48	1, 976	1. 84	341	. 69
Illinois	7, 122	4. 54	5, 415	5. 04	1, 707	3. 44
Michigan	4, 849	3. 09	3, 855	3. 59	994	2. 01
Wisconsin	2, 964	1. 89	2, 338	2. 18	626	1. 26
West North Central	18, 426	11. 74	12, 182	11. 34	6, 244	12. 60
Minnesota	2, 638	1. 68	1, 859	1. 73	779	1. 57
Iowa	1, 790	1. 14	1, 525	1. 42	265	. 53
Missouri	8, 141	5. 19	4, 793	4. 46	3, 348	6. 75
North Dakota	232	. 15	192	. 18	40	. 08
South Dakota	282	. 18	234	. 22	48	. 10
Nebraska	3, 823	2. 44	3, 047	2. 84	776	1. 57
Kansas	1, 520	. 97	532	. 50	988	1. 99
South Atlantic	22, 958	14. 62	16, 790	15. 63	6, 168	12. 44
Delaware	----------	----------	----------	----------	----------	----------
Maryland	3, 078	1. 96	2, 711	2. 52	367	. 74
District of Columbia	3, 392	2. 16	3, 229	3. 01	163	. 33
Virginia	4, 085	2. 60	2, 152	2. 00	1, 933	3. 90
West Virginia	926	. 59	848	. 79	78	. 16
North Carolina	3, 818	2. 43	3, 223	3. 00	595	1. 20
South Carolina	1, 279	. 81	751	. 70	528	1. 07
Georgia	2, 314	1. 47	1, 918	1. 79	396	. 80
Florida	4, 066	2. 59	1, 958	1. 82	2, 108	4. 25
East South Central	9, 459	6. 03	8, 119	7. 56	1, 340	2. 70
Kentucky	2, 141	1. 36	1, 921	1. 79	220	. 44
Tennessee	5, 092	3. 24	4, 439	4. 13	653	1. 32
Alabama	1, 243	. 79	1, 157	1. 08	86	. 17
Mississippi	983	. 63	602	. 56	381	. 77
West South Central	9, 184	5. 85	6, 838	6. 37	2, 346	4. 73
Arkansas	823	. 52	765	. 71	58	. 12
Louisiana	2, 415	1. 54	2, 157	2. 01	258	. 52
Oklahoma	1, 634	1. 04	795	. 74	839	1. 69
Texas	4, 312	2. 75	3, 121	2. 91	1, 191	2. 40
Mountain	9, 615	6. 12	3, 681	3. 43	5, 934	11. 97
Montana	92	. 06	92	. 09	----------	----------
Idaho	226	. 14	90	. 08	136	. 27
Wyoming	218	. 14	----------	----------	218	. 44
Colorado	2, 157	1. 37	1, 436	1. 34	721	1. 45
New Mexico	645	. 41	542	. 50	103	. 21
Arizona	4, 344	2. 77	447	. 42	3, 897	7. 86
Utah	1, 809	1. 15	950	. 88	859	1. 73
Nevada	124	. 08	124	. 12	----------	----------
Pacific	20, 116	12. 81	13, 650	12. 71	6, 466	13. 04
Washington	1, 515	. 97	1, 217	1. 13	298	. 60
Oregon	2, 157	1. 37	963	. 90	1, 194	2. 41
California	15, 851	10. 10	10, 899	10. 15	4, 952	9. 99
Alaska	69	. 04	47	. 04	22	. 04
Hawaii	524	. 33	524	. 49	----------	----------
Outlying areas [1]	1, 092	. 70	1, 092	1. 02	----------	----------

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[1] Includes Puerto Rico, Virgin Islands, and Guam. The amounts to the Virgin Islands and Guam were a small fraction of the total.

SOURCE: National Science Foundation (CASE).

division fourth. Although the Pacific division was the second largest recipient of NSF funds, this division received only $6 million—less than one-half of the amount NSF obligated to institutions in the Middle Atlantic division.

The next largest share of general support for science obligations was in the Pacific division. General support funds to universities and colleges in California totaled $16 million, over three-fourths of the $20 million division total. An additional $18 million, or 12 percent, was allocated to academic institutions in the West North Central.

Following these in order were the Mountain, New England, and East South Central divisions which accounted for almost identical shares—6 percent—of the total general support obligations. Only in the Mountain division did NSF obligations exceed those from NIH; NSF support comprised 62 percent of this division's $10 million total. Of the $6 million NSF obligated to the Mountain division, 66 percent was directed to three universities in Arizona.

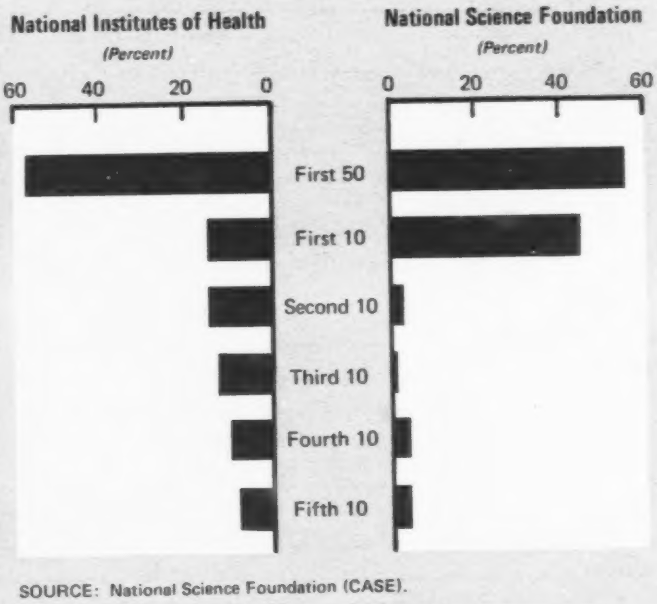
Even though the West South Central ranked last, this division's total of $9 million was not significantly less than the amount obligated to each of the three preceding divisions.

Institutional patterns of support

A total of 326 universities and colleges received funds under general support for science programs. As in other categories of support, obligations were concentrated within the group of institutions that ranked in the top 100. These universities and colleges received 79 percent of the total support for this activity (appendix table B–18). The National Institutes of Health obligated $88 million and the National Science Foundation $36 million to the 100 institutions receiving the largest amounts for general support purposes.

Even though the first 50 universities and colleges were reported receiving 56 percent of both NIH and NSF obligations, the percent distribution of general support funds by these two agencies varied considerably as shown in chart 19. NSF funds were heavily concentrated among the first 10 institutions with this group receiving 45 percent of NSF's total obligations for general support compared to only 14 percent of NIH's total. In fact, the second-ranked group received a slightly higher proportion of NIH's total support than did the first, yet received only 3 percent of NSF's total support. A substantial difference in the degree of agency concentration also existed for the third-ranked group of institutions which accounted for 12 percent of NIH's general support funds, but only 1 percent of NSF's. The two remaining ranked groups received a greater share of NIH's total support than of NSF's, but the differences between each agency's distribution of funds to these groups were not as widespread as those previously noted.

Chart 19.
Distribution of general support for science obligations to the 50 universities and colleges receiving the largest amounts, ranked in various groups, by agency, FY 1969



SOURCE: National Science Foundation (CASE).

Although, as a whole, institutions comprising the top 100 received 82 percent of HEW's general support obligations, as compared to 72 percent of NSF's total, individually they received smaller proportions of HEW's total funding for general support than of NSF's total. For example, the leading recipient of HEW funds, the University of Michigan, received $2 million, only 2 percent of HEW's total (appendix table B–19). Whereas New York University, the leading NSF recipient, accounted for over 9 percent of the Foundation's general support obligations.

The composition of the 100 institutions receiving the largest amounts for general support changed considerably from that for academic science and research and development. Thirty-three of the first 100 recipients in this category of support were not among the top 100 recipients in terms of total academic science support and R. & D. support.

Not only did the composition of the first 100 change significantly from that for other activities, but significant shifts in ranking occurred. As an example, New York University led other academic institutions in receipt of funds for general support projects. But this institution ranked only 14th for total academic science support and 18th for research and development. Likewise, the University of Pittsburgh, ranking second in terms of general support funds, ranked 26th for total academic science support and 32nd for R. & D. support. It is noteworthy that the Massachusetts Institute of Technology which in fiscal year 1969, as it has been in previous years, was the leading recipient of both total academic science obligations and R. & D. obligations, was not among the 100 ranking universities and colleges in terms of general support obligations.

The changes in composition and shifts in ranking are consistent with the objective of this category of support, that is, to assist institutions of higher education in the maintenance and improvement of scientific research and education. General support for science grants broaden the financial base of those universities and colleges which are striving to develop outstanding science programs and facilities so that they will be qualified to participate more extensively in research and training activities.

Educational Institutes, Seminars, or Conferences

Federal funds for educational institutes, seminars, or conferences totaled over $35.2 million in fiscal year 1969. This educational activity was almost wholly supported by the National Science Foundation with its obligations amounting to $35 million, 24 percent of the Foundation's science education funds. The remaining $49,000 for educational institute funding came from the National Aeronautics and Space Administration.

These educational institutes are directed to individuals at various professional levels (table 18). National Science Foundation funds for institutes attended by secondary school teachers amounted to $34 million—97 percent of its total support with this level of involvement accounting for 93 percent of all participants. In contrast, obligations to the second largest recipient group, elementary school teachers, totaled only $490,000—1 percent of educational institute funding. The predominance of institutes for individuals at the precollege teacher level results from one of the major objectives of NSF's educational programs, that is, to improve the quality of learning by upgrading instruction in the sciences at precollege levels. This is achieved through these institutes which not only provide teacher training in the implementation of new science curriculums, but which also provide graduate training in specific fields of science.

Table 18.—*Obligations by the National Science Foundation to universities and colleges for educational institutes, seminars, or conferences, by level and number of attendees, fiscal year 1969*

[Dollars in thousands]

Level (ranked in order of educational institute obligations)	Amount	Number of attendees
Total, all levels	$35, 116	35, 323
Secondary school teachers	34, 110	32, 855
Elementary school teachers	490	460
University and college faculty	334	947
Precollege students	79	950
Prebaccalaureate students	62	31
Professional school students	39	40
Graduate students	2	40

Source: National Science Foundation (CASE).

Of NSF's educational institute obligations, $334,000 was directed to institutes, seminars, or conferences for university and college faculty. Even though this professional group ranked third in terms of obligations, it constituted the second largest group of participants. NASA's obligations were directed to activities at this level of participation.

Fields of science

Of the National Science Foundation's funding for educational institutes, nearly one-third was in the field of mathematics (table 19). The $11 million obligated to projects in this field represented the largest single share of obligations directed to a specific field of science. An additional $4 million of NSF obligations was allocated to the physical sciences with projects in chemistry and physics comprising almost 75 percent of the total for this field. The life sciences and the environmental sciences were the next ranking fields, each of which accounted for 11 percent and 9 percent, respectively, of NSF's funding. The remaining fields, the social sciences, engineering, and psychology, together comprised less than 5 percent of total obligations.

Table 19.—*Obligations by the National Science Foundation to universities and colleges for educational institutes, seminars, or conferences, by field of science, fiscal year 1969*

[Dollars in thousands]

Field of science	National Science Foundation	
	Amount	Percent distribution
Total, all fields	$35, 116	100. 00
Physical sciences	4, 481	12. 76
Mathematics	11, 115	31. 65
Environmental sciences	3, 022	8. 61
Engineering	275	. 78
Life sciences	3, 721	10. 60
Psychology	103	. 29
Social sciences	1, 154	3. 29
Other sciences, n.e.c	11, 245	32. 02

Source: National Science Foundation (CASE).

Table 20.—*Obligations by the National Science Foundation to universities and colleges for educational institutes, seminars, or conferences, by geographic division, fiscal year 1969*

[Dollars in thousands]

Geographic division	National Science Foundation	
	Amount	Percent distribution
United States, total	$35, 116	100. 00
New England	2, 317	6. 60
Middle Atlantic	5, 030	14. 32
East North Central	7, 567	21. 55
West North Central	3, 598	10. 25
South Atlantic	4, 412	12. 56
East South Central	1, 703	4. 85
West South Central	3, 818	10. 87
Mountain	2, 388	6. 80
Pacific	4, 054	11. 54
Outlying areas [1]	229	. 65

[1] Includes Puerto Rico, Virgin Islands, and Guam. The amounts to the Virgin Islands and Guam were a small fraction of the total.

Source: National Science Foundation (CASE).

The substantial proportion—$11 million—of NSF's funding for educational institutes classified as "other sciences, n.e.c." can be in part attributed to the following: institutes for teacher training that are either interdisciplinary or multidisciplinary; institutes for science supervisors; and basic science institutes.

Geographic patterns of support

Universities and colleges in the East North Central division received the largest proportion of NSF obligations for educational institutes—22 percent of the $35 million total (table 20). The next three ranking divisions, the Middle Atlantic, South Atlantic, and Pacific (in order of educational institute obligations), together accounted for an additional 38 percent of the total funding. Institutions in New York were the leading recipients of educational institute support with obligations totaling $3 million, over one-half of the division total. Of the $4 million obligated to the West South Central division, 43 percent was received by academic institutions in Texas and 27 percent by institutions in Oklahoma. NSF obligated nearly $4 million to universities and colleges in the West North Central division. Among the States comprising this latter division, there was a relatively even dispersion of educational institute funds. Obligations in the Mountain and New England divisions totaled $5 million, with each receiving similar proportions—almost 7 percent—of the total allocation for this activity.

The overall pattern of geographic support parallels the pattern of support for institutes designed for secondary school teachers, whose support as stated previously comprises the major proportion of total funding. However, the geographic distribution does not necessarily reflect the relative importance of upgrading science instruction in a given geographic area, since participants, except those at inservice institutes, may be drawn from all parts of the country.

Institutional patterns of support

Table 21 presents ranked groups of institutions receiving the largest amounts of NSF support for educational institutes. Of the 375 universities and colleges receiving funds for this activity, the first 100 accounted for less than two-thirds of the total amount obligated. Thus, universities and colleges ranking below the top 100 evidence a greater proportion of funding than those ranking below the first 100 in other categories of support. Yet, as demonstrated in the table, there is some degree of concentration of obligations among the first 100 recipients. The first 50 institutions were reported receiving 46 percent of educational institute obligations with the first 10 institutions accounting for almost 14 percent of total educational institute funding.

In terms of educational institute support, the two leading recipients were the University of Illinois and the University of Oklahoma with obligations totaling $619,000 and $614,000,

TABLE 21.—*Obligations by the National Science Foundation for educational institutes, seminars, or conferences to the universities and colleges receiving the largest amounts, ranked in various groups, fiscal year 1969*

[Dollars in thousands]

Number of institutions (ranked in order of educational institute obligations	National Science Foundation	
	Amount	Percent distribution
Total, all institutions	$35,116	100.00
First 10	4,738	13.49
Second 10	3,783	10.77
Third 10	2,984	8.50
Fourth 10	2,544	7.24
Fifth 10	2,177	6.20
First 50	16,226	46.21
Second 50	7,157	20.38
First 100	23,383	66.59
All other	11,733	33.41

SOURCE: National Science Foundation (CASE).

respectively. The $619,000 obligated to the University of Illinois supported six projects: one project for university and college faculty in the amount of $2,000 with 41 attendees and five projects for secondary school teachers totaling $617,000 with 339 attendees. The nine projects at the University of Oklahoma which received amounts totaling $614,000 were institutes attended by 335 secondary school teachers.

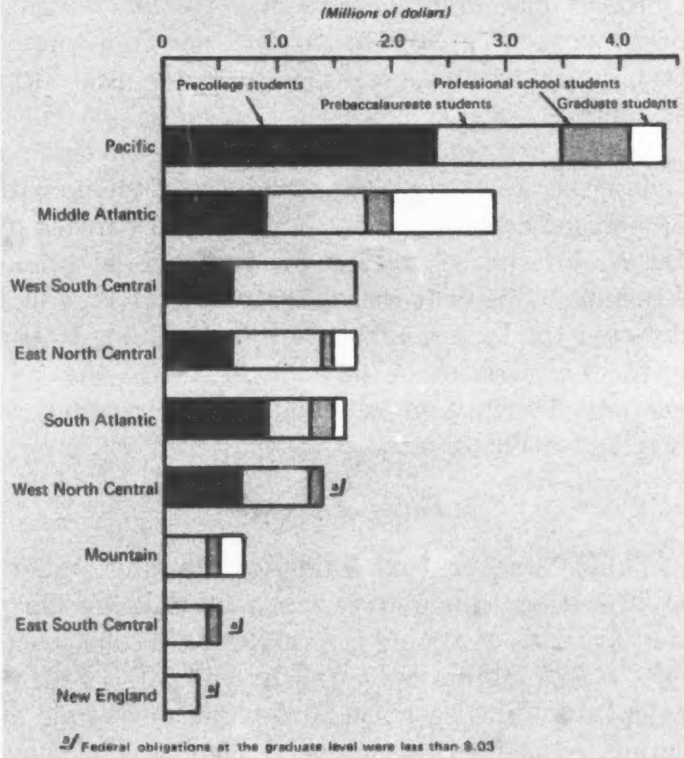
Development of Educational Techniques and Materials

Consistent with the educational needs and goals of the Nation is the continuing support provided by Federal agencies for projects aimed at developing new curriculum materials, improving or strengthening existing curriculums, and implementing the instructional materials. Three Federal agencies, the Department of Health, Education, and Welfare, the National Science Foundation, and the Office of Economic Opportunity, together obligated $15 million for these activities. Over two-thirds, $11 million, of the total obligations to universities and colleges for the development of educational materials and techniques was contributed by the National Science Foundation.

The educational materials and techniques developed through the various agency-sponsored programs are directed to the following levels of utilization: Graduate students, professional school students, prebaccalaureate students, and precollege students. Funds supporting programs designed for prebaccalaureate and precollege students accounted for 80 percent of the total obligations for all levels, with nearly identical shares—40 percent each (table 22). The National Science Foundation provided the largest proportion of

Chart 20.

Federal obligations for development of educational techniques and materials, by geographic division and level of utilization, FY 1969



a/ Federal obligations at the graduate level were less than $.03 million.

SOURCE: National Science Foundation (CASE).

TABLE 22.—*Federal obligations for development of educational techniques and materials to universities and colleges, by level of utilization and agency, fiscal year 1969*

[Dollars in thousands]

Level of utilization	Total	Department of Health, Education, and Welfare	National Science Foundation	Office of Economic Opportunity
Total, all levels	$15,272	$2,465	$10,565	$2,242
Graduate Students	1,735	754	981	....
Professional school students	1,284	1,210	74	....
Prebaccalaureate students	6,130	370	5,760	....
Precollege students	6,123	131	3,750	2,242

SOURCE: National Science Foundation (CASE).

its funds in support of programs for these two educational levels with 55 percent to prebaccalaureate students and 35 percent to precollege students. The entire $2 million obligated by the Office of Economic Opportunity to this category of support was directed to the development of techniques or materials designed for precollege students.

Eleven percent of the total support for this activity went to programs for graduate students with 57 percent contributed by NSF and 43 percent by HEW. Of the $1 million for professional school students, 94 percent was obligated by HEW, which directed the largest proportion of its funds to this level of utilization. Chart 20 illustrates the geographic distribution of obligations according to levels of utilization.

Fields of science

Table 23 shows that funds for the development of educational techniques and materials are fairly well distributed among the various fields of science. Of the $15 million obligated by the three Federal agencies for this activity, 20 percent, or $3 million, supported projects in the social sciences. The Office of Economic Opportunity's total obligations, $2 million, were directed to projects in this field. The second largest field to be funded was the life sciences for which obligations totaled $2 million, over 70 percent of which was obligated by HEW. Of HEW's $1.3 million total in the life sciences, $1.2 million was in support of projects funded by NIH.

Projects in the physical sciences and mathematics each accounted for 10 percent of the total support for this activity, with the National Science Foundation being the sole contributor to the field of mathematics. Both the Office of Education and the National Science Foundation funded projects in the physical sciences with support concentrated in the area of physics. Except for projects that could not be assigned to one of the seven major fields of science, projects in the physical sciences and mathematics accounted for the largest proportions of NSF support.

TABLE 23.—*Federal obligations for development of educational techniques and materials, by field of science and agency, fiscal year 1969*

[Dollars in thousands]

Field of science	Total	Department of Health, Education, and Welfare	National Science Foundation	Office of Economic Opportunity
Total, all fields	$15, 272	$2, 465	$10, 565	$2, 242
Physical sciences	1, 554	220	1, 334	....
Mathematics	1, 535	....	1, 535	....
Environmental sciences	375	131	244	....
Engineering	805	....	805	....
Life sciences	1, 812	1, 307	505	....
Psychology	484	484	....	....
Social sciences	3, 036	323	471	2, 242
Other sciences, n.e.c	5, 671	....	5, 671	....

SOURCE: National Science Foundation (CASE).

Projects in engineering and psychology were awarded 5 percent and 3 percent, respectively, of the total funding; projects in the field of engineering were wholly supported by NSF and those in psychology by the Office of Education. Less than 3 percent, or $375,000, was allocated to the environmental sciences. Of the operating agencies within HEW, the Consumer Protection and Environmental Health Services was the only contributor to the environmental sciences directing all of its support in this field to the atmospheric sciences. On the other hand, NSF with environmental science obligations amounting to $244,000 directed the largest proportion of its funds to the geological sciences.

In this category of science education support, NSF was the only agency to classify projects as "other sciences, n.e.c." The relatively high proportion (54 percent) of NSF obligations in "other sciences, n.e.c." results from curriculum improvement projects that encompass more than one field of science.

Geographic patterns of support

In contrast to the geographic pattern for other categories of academic science support, the highest proportion of total obligations for the development of educational techniques and materials was received by the Pacific division (table 24). Academic institutions in this division accounted for $4.4 million, over 28 percent of the $15 million obligated to institutions in all divisions. This amount primarily reflects obligations to universities and colleges in California which totaled $3.7 million, well over four-fifths of the division total. National Science Foundation funds comprised 79 percent of the total support for this division and 75 percent of the total funding in California.

States in the Middle Atlantic division, ranking second, received $3 million—35 percent less than the Pacific division. Although NSF was again the major contributor, the Department of Health, Education, and Welfare provided universities and

TABLE 24.—*Federal obligations for development of educational techniques and materials, by geographic division and agency, fiscal year 1969*

[Dollars in thousands]

Geographic division	Total	Department of Health, Education, and Welfare	National Science Foundation	Office of Economic Opportunity
United States, total	$15,272	$2,465	$10,565	$2,242
New England	323	37	286	----------
Middle Atlantic	2,871	902	1,423	546
East North Central	1,721	173	1,107	441
West North Central	1,452	88	1,007	357
South Atlantic	1,618	142	1,211	265
East South Central	421	58	363	----------
West South Central	1,734	7	1,161	566
Mountain	744	196	548	----------
Pacific	4,388	862	3,459	67
Outlying areas[1]	----------	----------	----------	----------

[1] Includes Puerto Rico, Virgin Islands, and Guam.

SOURCE: National Science Foundation (CASE).

colleges in this division with the largest proportion of HEW support. Two of the three States in this division, New York and Pennsylvania, accounted for 97 percent of the division total.

The West South Central division was the primary recipient of funds from the Office of Economic Opportunity. Louisiana and Texas received $380,000 and $186,000, respectively, from this agency. Of the $1.2 million obligated by NSF to academic institutions in the West South Central division, $1.1 million funded projects in Texas.

Ranking next was the East North Central division with universities and colleges in this division accounting for 11 percent of the total obligations. Two States, Illinois and Michigan, received over $1 million of the $2 million obligated to this division.

Following these divisions, in order, were the South Atlantic and West North Central divisions with obligations totaling $1.6 million and $1.5 million, respectively. Agency support to academic institutions in the three remaining divisions amounted to only $1.5 million, less than 10 percent of the total for this category of support. It is notable that the New England division, which includes a number of institutions that receive a substantial proportion of total academic science support and R. & D. support, received the smallest percentage of support for the development of educational techniques and materials.

Institutional patterns of support

In 1969, a total of 172 institutions received Federal support for the development of educational techniques and materials from the three Federal agencies contributing to this category of academic science support. Federal funds to the 50 institutions receiving the largest amounts totaled $13 million—85 percent of the total funding (table 25). Each of the Federal agencies contributing to this activity concentrated at least four-fifths of its total obligations to institutions in this group with the Office of Economic Opportunity obligating 99 percent of its total support among the first 50.

This concentration of support among the top 50 recipients is further demonstrated when the first 20 universities and colleges are considered. Obligations to the first 20 institutions totaled $9 million—almost 60 percent of the entire amount obligated under this category of support. Funds to the first 10 recipients comprised 46 percent of NSF's obligations in this area of support and 32 percent of HEW's. OEO support was concentrated among the second ranked group of 10 institutions which group received 52 percent of OEO's total funding.

The percentage distribution of obligations to the top 20 institutions by level of utilization evidenced significant variations. The first 20 recipients accounted for 88 percent of the total funds directed to programs for precollege students, but only 33 percent of the funds for professional

TABLE 25.—*Federal obligations for development of educational techniques and materials to universities and colleges receiving the largest amounts, ranked in various groups, by agency, fiscal year 1969*

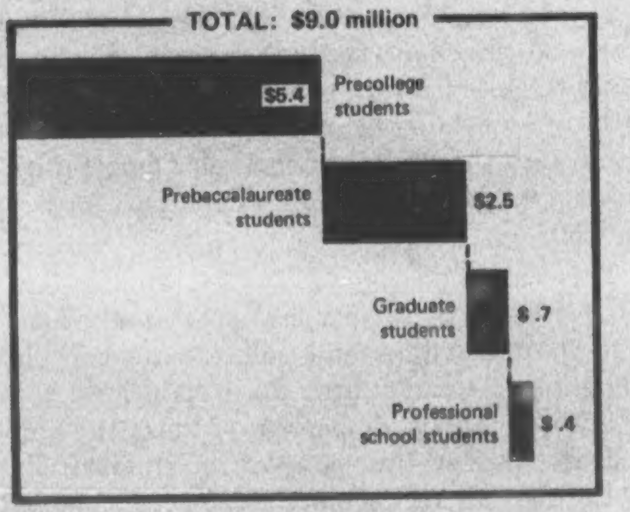
[Dollars in thousands]

Number of institutions (ranked in order of obligations)	Total	Department of Health, Education, and Welfare	National Science Foundation	Office of Economic Opportunity
Total, all institutions	$15,272	$2,465	$10,565	$2,242
First 10	6,129	782	4,891	456
Second 10	2,833	360	1,297	1,176
Third 10	1,769	393	848	528
Fourth 10	1,352	263	1,089	----------
Fifth 10	911	197	662	52
First 50	12,994	1,995	8,787	2,212
All other	2,278	470	1,778	30

SOURCE: National Science Foundation (CASE).

Chart 21.

Distribution of Federal obligations for development of educational techniques and materials to the 20 universities and colleges receiving the largest amounts, by level of utilization, FY 1969



SOURCE: National Science Foundation (CASE).

students. In addition, this group received 40 percent of the obligations for projects directed to the development of materials both for graduate students and prebaccalaureate students. Chart 21 shows the distribution of obligations to the first 20 institutions by level of utilization.

The University of California at Berkeley was the largest recipient of Federal support for the development of educational techniques and materials, receiving $1.6 million, more than twice the amount obligated to Stanford University which ranked second (table 26). Of the $1.5 million contributed by the National Science Foundation in support of projects at the University of California, $1.2 million, which represented the largest grant under this activity, supported a Science Curriculum Improvement Study for precollege students. Florida State University, the third ranking academic institution, received the second largest award. This award by NSF in the amount of $620,000 provided support for an intermediate interdisciplinary sequential science program. Michigan State University received $441,000 from the Office of Economic Opportunity, the largest amount obligated by OEO in this category of support. The largest funding by HEW under this activity was $428,000 to San Francisco State College. This was directed to educational materials designed for professional school students, accounting for over one-third of the obligations for projects at this level of utilization.

TABLE 26.—*Federal obligations for development of educational techniques and materials to the 20 universities and colleges receiving the largest amounts, by agency, fiscal year 1969*

[Dollars in thousands]

Institution (ranked in order of obligations)	State	Total	Department of Health, Education, and Welfare	National Science Foundation	Office of Economic Opportunity
Total, 20 institutions	....	$8,962	$1,142	$6,188	$1,632
1. University of California—Berkeley	Calif.	1,610	71	1,524	15
2. Stanford University	Calif.	750	....	750	....
3. Florida State University	Fla.	620	....	620	....
4. University of Illinois—Urbana	Ill.	516	10	506	....
5. University of Texas—Austin	Tex.	502	....	502	....
6. University of Pittsburgh	Pa.	459	....	459	....
7. Michigan State University	Mich.	441	....	....	441
8. San Francisco State College	Calif.	428	428	....	....
9. University of Minnesota	Minn.	411	....	411	....
10. Pennsylvania State University	Pa.	392	273	119	....
11. Tulane University	La.	380	....	....	380
12. University of Kansas	Kan.	366	9	....	357
13. University of Denver	Colo.	357	....	357	....
14. University of California—Irvine	Calif.	326	131	195	....
15. University of Pennsylvania	Pa.	263	....	263	....
16. New York University	N.Y.	241	220	21	....
17. University of Iowa	Iowa	240	....	240	....
18. Shaw University	N.C.	235	....	....	235
19. University of Chicago	Ill.	214	....	214	....
20. Columbia University [1]	N.Y.	211	....	7	204

[1] Main University only.

SOURCE: National Science Foundation (CASE).

APPENDIXES

A. Technical Notes

B. Statistical Tables

APPENDIX A

Technical Notes

Scope

Funding data represent actual obligations incurred during fiscal year 1969 by the participating agencies for more than 40,000 federally sponsored science and engineering projects conducted at universities and colleges in the United States and outlying areas.

For the present report ten Federal agencies, accounting for more than 95 percent of total Federal support for academic science, provided data for fiscal year 1969:

Department of Agriculture
Atomic Energy Commission
Department of Commerce
Department of Defense
Department of Health, Education, and Welfare
Department of the Interior
National Aeronautics and Space Administration
National Science Foundation
Office of Economic Opportunity
Department of Labor

Data for individual institutions represent direct support from Federal agencies and do not make allowances for amounts subcontracted to or from other institutions. Consequently, the location of actual performance of obligated amounts cannot be identified if that performance takes place at some site other than that of the institution receiving direct support from Federal agencies. In cases of interagency transfers of funds, the agency that made the final distribution of the funds to academic institutions reported the obligations.

Federal obligations for higher educational activities considered to be primarily nonscience in nature, such as general support for undergraduate education, were not included in the study. Nonscience support amounted to approximately $1 billion in fiscal year 1969. Other allocations for financial assistance by Federal agencies excluded from the study are repayable loans such as those made by the Office of Education, and agency support of Federal employee training and development activities.

The source of data for this report is the CASE II reporting system, established to make available in a central data bank comprehensive information on government-wide funding of science and engineering activities at universities and colleges. Data were reported at the project level, but for tabular use in this report, were aggregated to the institution, agency, and other levels. The information from which this report was derived is more detailed than data reported at the institutional level included in the current series of related reports, *Federal Support to Universities, Colleges, and Selected Nonprofit Institutions*, for which the primary source of data is the CASE I reporting system.

This report's further division of academic science support beyond that reported in the CASE I system involves: (1) The number of academic science categories; (2) fields of science; and (3) additional data on some of the more important characteristics for selected types of activity, such as facilities and equipment projects.

The present report includes data on the following major project characteristics of academic science support: (1) Sponsoring agency, (2) recipient institution, (3) type of activity, (4) amount obligated, and (5) field of science.

In addition, sections 2 and 3 contain more detailed information on various characteristics of facilities and science education support.

Limitations

The following factors should be considered in the analysis and interpretation of data in this report:

(1) As mentioned above, data are reported at

the project level. Due to limitations on the physical size of each project record reported, the instructions for reporting project characteristics, type of activity and field of science, restricted the classification of each of these elements to one category per project. Since some projects actually involve more than one type of activity or field of science, data aggregated from the project level may not reflect the precise amount of effort devoted to each area of activity and field of science. Moreover, these data can be expected to vary from comparable totals derived from the CASE I and *Federal Funds* data collection systems [1] which permit allocation of project or program funds between two or more types of activity or fields of science, depending on the primary focus, and, consequently, may not be in complete agreement with their classification for this report.

(2) Federal obligations to university "systems" were reported in terms of the individual institutions within a system. In cases where the final allocation of funds was not known at the time the award was made, the agencies could not identify the ultimate recipient institutions and, therefore, reported the obligations under the system's administrative office. To the extent that funds were subsequently distributed by the system's central office to one or more of the member institutions, published figures for those member institutions listed on any of the top 100 institution tables may be understated. System-wide academic science obligations, totaling $22 million in fiscal year 1969, included the following:

Maricopa County Junior College System
University and State College of Arizona System
Peralta Junior College District System
University of California System
University of Illinois System
Louisiana State University System
University of Maine System
University of Missouri System
University of Nevada System
City University of New York System
Columbia University System
State University of New York System
Union College and University System
University of North Carolina System
Pennsylvania State College System
Texas A&M University System
University of Texas System
University of Wisconsin System
University of Puerto Rico System

(3) The allocation of funds among the various types of activities, as reported by the agencies, may not indicate the way the funds are actually spent by the universities and colleges. For example, the entire total reported by the Department of Defense was reported under research and development, although some funds were expended for R. & D. plant and institutional development purposes. A further example involving the classification of project activities is the difference between immediate and ultimate objectives of support. Obligations reported as "general support for science" by the agencies are used by the institutions to fund research and development, facilities and equipment projects, and other specific scientific activities.

(4) Due to technical problems involved in adapting internal information systems to provide data for the CASE II system, a number of projects funded in fiscal year 1969 were not included in the data base. The omitted records, in general, do not represent a large portion of an agency's total academic science support. At the institutional level, however, agency and Federal-wide totals for a few individual institutions may be significantly understated.

(5) Department of Agriculture obligations amounting to $91 million were classified as "other related activities." These funds represent lump-sum awards to land-grant institutions for which the specific type of activity could not be determined in time to be incorporated in USDA's report to CASE. Also, most USDA sponsored projects are considered multidisciplinary, accounting for the large proportion of that agency's funds classified as "other sciences, not elsewhere classified."

(6) Field of science data for the Department of Defense were estimated. The DOD was able to report field of science information on projects totaling $167 million. The remaining $105 million was allocated across the science and engineering disciplines according to the percentage distribution of the $167 million. Since the rate of imputation is very high for those institutions with substantial funding from DOD, field of science data at the institution level are not shown in this report.

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[1] For a more detailed explanation of reporting differences and other relationships between this report and the reports generated from the *CASE I* and *Federal Funds* data collection systems, see "Relation to other Reports," p. 51.

Definitions

General

(*a*) *Project.* A typical work unit used by agencies to report funding activities. A project may be funded by a single award or may be supplemented (increase in funds), or extended (additional funds plus additional time).

(*b*) *University or college.* Consists of all parts of the academic institution—such as a college of liberal arts, professional school, hospital, school of agriculture, agricultural experiment station, etc.—except an associated Federally Funded Research and Development Center. Universities and colleges include all institutions of higher education in the United States that offer at least 2 years of college-level studies in residence. The universe of institutions for this report is based upon the Office of Education's *Education Directory 1968–69: Part 3, Higher Education.* To be included in this report, an institution must have received some Federal academic science support in fiscal year 1969 and must possess a significant degree of autonomy with respect to educational administrative responsibilities. Thus, universities and colleges organized under systems, e.g., groups of institutions collectively having legal status and generally accorded recognition by a State, by a board of education, or other relevant organization, are shown as separate institutions in cases where significant autonomy exists. Obligations to the Service schools (West Point, the Naval, and Air Force academies, etc.) were excluded from the study. Also excluded were funds awarded to the U.S. Department of Agriculture Graduate School.

(*c*) *Obligated amount.* Represents the actual dollar obligation incurred during the reporting year, fiscal year 1969, regardless of when the funds were appropriated or when they are to be spent by the recipient. The amount reported includes direct and indirect costs, but excludes repayable loans. Federal obligations to State agencies which, in turn, allocate the funds to educational institutions within the State are also excluded. In the case of an interagency transfer of funds, the agency which finally obligated the funds to the academic institution reported the award.

(*d*) *Fiscal year.* The Government accounting period beginning July 1 of one year and ending June 30 of the following calendar year; thus, fiscal year 1969 began on July 1, 1968, and ended on June 30, 1969.

Types of Activity

Academic science consists of all aspects of research, education, and related activities in the sciences and engineering performed in universities and colleges. (See page 49 for specific information on the disciplines included in science and engineering.) For the purpose of this study Federal agencies reported their science and engineering projects in terms of eight categories of activity:

(*a*) *Research and development.* Research is systematic intensive study directed toward fuller scientific knowledge or understanding of the subject studied; development is systematic use of the knowledge gained from research, directed toward the production of useful materials, devices, systems, or methods, including design and development of prototypes and processes.

(*b*) *Manpower development.* Includes all projects which are directed primarily toward the training of scientific and technical manpower. Included here are fellowships, traineeships, and training grants whether these are awarded to individuals or to groups of individuals. The following activities are excluded from this category: Research or educational institutes, seminars, and conferences; development of educational techniques or materials; Federal agency support of Federal employee training and development; and fellowships or traineeships received by foreign nationals.

Additional data elements include *amount of nonstipend payment*, the amount of an award paid directly by the granting agency to an institution for the institution's own use, not the amount provided to the institution for direct transfer to individual fellows, trainees, or other recipients being trained on a manpower development project. Included in the nonstipend amount were funds provided by granting agencies such as tuition and fees paid to fellowship institutions, and cost-of-education allowances which are designed to enable institutions that participate in manpower development projects to strengthen their graduate science programs by providing them with an allowance for each graduate student trained in advanced degree programs. Excluded from this amount were special allowances for equipment and special travel in connection with fellowships and training programs that were retained by the individual.

Another data element is *duration of project activity*, which is that period of time in months during which the actual activity is to take place as distinguished from the duration of the grant or contract award itself. *Type of participation*, another element, reflects the extent to which a manpower development participant, or most of the participants in a group project, devotes his efforts toward the activity being supported by the project. A *full-time participant* is one who, for the duration of the project activity, is to devote at least three-fourths of his normal full-time effort; a *part-time participant* is one who, for the duration of the project activity, will devote less than three-fourths of normal full-time effort to the sponsored activity. If a project supported essentially equal numbers of both full-time and part-time participants, it was reported as *mixed*.

(*c*) *Facilities and equipment*. Includes all projects whose principal purpose is to provide support for construction, acquisition, renovation, modification, repair, or rental of facilities, land, works, or equipment for use in scientific or engineering research, development, or education. Included also are funds for maintenance and basic operations of such facilities and equipment. A facility is interpreted broadly to include any physical resource important to the conduct of research, development, or education objectives. All costs—direct, indirect, and related expenditures—are included.

Additional data elements include *purpose of funds*. Under this heading the following definitions apply:

Construction refers to new construction, renovation, acquisition, leasing, modification, and repair of buildings, resource centers, and major equipment. Included also are planning and design studies for construction.

Basic operations refers to those costs, including maintenance of a facility, resource, or major piece of equipment required to maintain the capability of performing research, development, or education. For example, the cost of maintaining and operating a computer center is an example of "basic operations."

Type of facility, another additional data element, indicates the principal or major function of the facility receiving project support. The following nine categories were established for this study:

Research laboratories—facilities primarily devoted to the conduct of research and development.

Instructional classrooms and laboratories—facilities primarily devoted to transfer of knowledge by lecture, course work, and laboratory experiments.

Library—a facility primarily devoted to cataloging, storage, and retrieval of documents, books, periodicals, and information in general.

Research equipment—equipment and facilities used primarily as tools to assist in research investigations and study.

Teaching/training equipment—equipment and facilities used primarily as tools to assist in the transfer of knowledge.

Land—an area of earth acquired, rented, or leased with project funds.

Computer and/or computer center—facilities and/or equipment possessing electronic data processing capabilities.

Hospital and/or medical facility (*exclusive of medical schools, etc.*)—facilities oriented toward study, research, diagnosis, and treatment of clinical medical problems.

Other—facilities or equipment for uses other than those listed above.

(*d*) *General support for science*. Includes projects which provide support for nonspecific or generalized purposes related to scientific research and education. Such projects are generally oriented toward academic departments, institutes, or institutions as a whole. "General support" implies a spectrum of varying types of support. At one extreme is support provided without any specification of purpose other than the funds be used for scientific activities. Another kind of "general support" is to be found in projects that provide funds for activity within a specified field of science or engineering but without specification of explicit purpose. The distinguishing feature of "general support for science" projects is that they permit a significant measure of freedom to the institution in determining the purpose of support—research, construction of new facilities, faculty support, education, etc.

The following agency programs were reported under this category in fiscal year 1969:

NIH Biomedical Sciences Support Grants
NIH General Research Support Grants
NSF University Science Development Grants
NSF Departmental Science Development Grants
NSF College Science Improvement Grants

(*e*) *Research institute, seminar, or conference*. Includes all projects which support a meeting of scientists and/or engineers whose objective is a fuller understanding of a specific or general problem, or field of study. The primary purpose of such institutes, seminars, and conferences is the exchange of information on current research and development. Excluded here are educational institutes, seminars, and conferences and activities aimed at the development of educational techniques or materials.

An additional data element within this activity is *principal professional level of participants*, the professional level most representative of the individuals attending a research institute, seminar, or conference. The various levels are defined below.

College and university faculty: Individuals who are regarded by the grantee or institution where the activity is being sponsored as faculty members of a college or university.

Nonfaculty staff—doctorals: Individuals who hold a doctorate degree or its equivalent and who are not classified as college or university faculty or students.

Nonfaculty staff—others: Individuals who work at the professional level who do not hold a doctorate degree or its equivalent and who are not classified as faculty members, nonfaculty staff—doctorals, or students.

Students—graduate: Students who hold at least a bachelor's degree or its equivalent and who are enrolled in a degree program (part-time or full-time) leading to an advanced degree in science, mathematics or engineering, degrees which are not generally regarded to be in the professional fields such as law, medicine, dentistry, etc.

Students—professional schools: Students who hold at least a bachelor's degree or its equivalent and who are pursuing a program leading to a professional degree (medical, dental, veterinary, etc.) either full-time or part-time.

Students—prebaccalaureate: Students enrolled in a degree program (part-time or full-time) leading to a degree in science and engineering.

Precollege students: Individuals who have not yet become regularly enrolled undergraduate students.

(*f*) *Educational institute, seminar, or conference.* Includes all educational meetings aimed toward study, analysis, discussion, advancement, and improvement of the teaching of science and engineering. Included here are institutes for teachers of science, mathematics, and engineering. Excluded, however, are projects which provide support for seminars, conferences, etc., involving the exchange of current R. & D. information among professional scientists, mathematicians, and engineers.

An additional data element is *principal professional level of attendees*, the professional level most representative of the individuals attending an educational institute, seminar, or conference. The various levels include the seven defined under research institute, seminar, or conference and two more shown below.

Secondary school teachers: Individuals whose primary occupation is teaching at the secondary school level.

Elementary school teachers: Individuals whose primary occupation is teaching at the elementary school level.

(*g*) *Development of educational techniques or materials.* Includes those projects oriented toward the actual development of new or revised educational materials, techniques, or devices for use in science or engineering training. Included are the creation of new models of courses and curriculums, course content development, the design and development of instructional materials, the writing of new text books, making of films, etc.

An additional data element includes *educational level*, the principal level of students at which the new techniques, materials, or devices are directed. The four student levels are graduate, professional school, prebaccalaureate, and precollege students.

(*h*) *Other related activities.* Includes all academic science projects that cannot meaningfully be assigned to one of the seven categories set forth above.

Fields of Science

Science and engineering represent the sum of all fields of science and engineering. These are divided into eight broad categories each consisting of a number of fields. Shown below are definitions of each broad field together with an illustrative list of disciplines under each of the subfields.

(*a*) *Physical sciences* are concerned with the understanding of the material universe and its phenomena. They comprise the fields of astronomy, chemistry, physics, and physical sciences not elsewhere classified. Examples of the disciplines under each of these fields are:

Astronomy:

Laboratory astrophysics; optical astronomy; radio astronomy; theoretical astrophysics; X-ray, gamma-ray, neutrino astronomy.

Chemistry:
Inorganic; organo-metallic; organic; physical.

Physics:
Acoustics; atomic and molecular; condensed matter; elementary particles; nuclear structure; optics; plasma.

Physical sciences, n.e.c.[2]

(*b*) *Mathematics* employs logical reasoning with the aid of symbols and is concerned with the development of methods of operation employing such symbols. Examples of mathematical disciplines are:

Algebra; analysis; applied mathematics; computer science; foundations and logic; geometry; numerical analysis; statistics; and topology.

(*c*) *Environmental sciences* (*terrestrial and extra terrestrial*) are concerned with the gross nonbiological properties of the areas of the solar system which directly or indirectly affect man's survival and welfare. They comprise the fields of atmospheric sciences, geological sciences, oceanography, and environmental sciences not elsewhere classified. Examples of the disciplines under each of these fields are:

Atmospheric sciences:
Aeronomy; solar; weather modification; extra terrestrial atmospheres; meteorology.

Geological sciences:
Engineering geophysics; general geology; geodesy and gravity; geomagnetism; hydrology; inorganic geochemistry; isotopic geochemistry; organic geochemistry; laboratory geophysics; paleomagnetism; paleontology; physical geography and cartography; seismology; soil sciences.

Oceanography:
Chemical oceanography; geological oceanography; physical oceanography; marine geophysics.

Environmental sciences, n.e.c.[2]

(*d*) *Engineering* is concerned with studies directed toward developing engineering principles or toward making specific scientific principles usable in engineering practice. Engineering is divided into eight categories: Aeronautical, astronautical, chemical, civil, electrical, mechanical, metallurgy and materials, and engineering not elsewhere classified. Examples of disciplines under each of these engineering fields are:

Aeronautical:
Aerodynamics.

Astronautical:
Aerospace; space technology.

Chemical:
Petroleum: petroleum refining; process.

Civil:
Architectural; hydraulic; hydrologic; marine; sanitary and environmental; structural; transportation.

Electrical:
Communication; electronic; power.

Mechanical:
Engineering mechanics.

Metallurgy and Materials:
Ceramic; mining; textile; welding.

Engineering, n.e.c.:[2]
Agricultural; industrial and management; nuclear; ocean engineering; systems.

(*e*) *Life sciences* consist of the biological, clinical medical, and life sciences not elsewhere classified.

Biological sciences are those which, apart from the clinical medical sciences defined below, deal with the origin, development, structure, function, and interaction of living things. The agricultural and basic medical sciences are included. Examples of biological sciences are:

Anatomy; animal sciences; bacteriology; biochemistry; biogeography; biological oceanography; biophysics; ecology; embryology; entomology; evolutionary biology; genetics; immunology; microbiology; nutrition and metabolism; parasitology; pathology; pharmacology; physical anthropology; physiology; plant sciences; radiobiology; systematics.

Clinical medical sciences are concerned with the use of scientific knowledge for the identification, treatment, and cure of disease. Examples of clinical medical sciences are:

Internal medicine; neurology; ophthalmology; preventive medicine and public health; psychiatry; radiology; surgery; veterinary medicine; dentistry; physical medicine and rehabilitation; pharmacy; and podiatry.

Life sciences, n.e.c.[2]

Psychology deals with behavior, mental processes, and individual and group characteristics and abilities. Psychology is divided into three categories: biological aspects, social aspects, and psychological sciences not elsewhere classified. Examples of the disciplines under each of these fields are:

Biological aspects:
Experimental psychology; animal behavior; clinical psychology; comparative psychology; ethology.

Social aspects:
Social psychology; educational, personnel, vocational psychology and testing; industrial and engineering psychology; development and personality.

Psychological sciences, n.e.c.[2]

Social sciences are directed toward an understanding of the behavior of social institutions and groups and of individuals as members of a group. These include anthropology, economics, history, linguistics, political science, sociology, and social sciences not elsewhere classified. Examples of the disciplines under each of these fields are:

Anthropology:
Archaeology; cultural and personality; social and ethnology; applied anthropology.

Economics:
Econometrics and economic statistics; history of eco-

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[2] See footnote on p. 51.

[2] See footnote on p. 51.

nomic thought; international economics; industrial, labor and agricultural economics; macroeconomics; microeconomics; public finance and fiscal policy; theory.

History:

Cultural; political; social; history and philosphy of science.

Linguistics:

Anthropological-archaeological; computational; psycholinguistics, sociolinguistics.

Political science:

Area or regional studies; comparative government; history of political ideas; international relations and law; national political and legal systems; political theory; public administration.

Sociology:

Comparative and historical complex organizations; culture and social structure; demography; group interactions; social problems and social welfare; sociological theory.

Social sciences, n.e.c.:[2]

Research in law and education, n.e.c.; socioeconomic geography.

Other sciences not elsewhere classified include multidisciplinary and interdisciplinary projects that cannot be classified within one of the above broad fields of science.

Relation to Other Reports

(1) *Federal Support to Universities, Colleges, and Selected Nonprofit Institutions* is produced by the National Science Foundation as an annual report to the President and Congress on Federal obligations to academic institutions and appropriate nonprofit institutions for research and development, R&D plant, and other related activities, as required by the 1968 amendment to the NSF Act. The primary source of data for this report is the CASE I reporting system.

Since CASE II is an extension of the academic science portion of the CASE I system, there should be, and is, relatively close agreement between totals generated in the two studies for the support of (1) academic science and (2) research and development. There are, however, several reasons why the figures do not agree completely. Among the principal factors contributing to reporting differences are the following:

(*a*) The basic reporting units under the two parts of the CASE data collection system are the *institution* in CASE I and the *project* in CASE II. Funds to institutions reported in CASE I are distributed among four types of support, including three categories for academic science activities and one for nonscience activities. This enables an agency to use a percentage split for an individual project or program between science and nonscience use of funds or among the three academic science categories. For each *project* reported in CASE II, however, only one type of activity may be designated by an agency. If the agency decides that the funds should be classified primarily under nonscience activities, such as funds for construction of a facility designated for undergraduate education, the entire grant would be excluded from the agency's CASE II report, which is only concerned with academic science projects. Conversely, were this project considered primarily science, the CASE II project total would exceed the CASE I figure by the amount reported as nonscience in CASE I.

(*b*) The differing academic science categories of support also lead to reporting differences between CASE I and CASE II. CASE I uses only three major classifications: research and development, R. & D. plant, and "other science activities." Some general support programs such as NSF's University Science Development Program encompass more than one of the CASE I academic science categories and are therefore, divided between them. CASE II, on the other hand, has among its eight categories of activities "general support for science," which is defined to cover programs which provide support for nonspecific purposes related to science research or education. By definition, "general support for science" covers the spectrum of academic science activities. Total obligations tabulated for each of the other categories of support in CASE II, especially research and development and facilities and equipment, are understated by that portion of the general support funds ultimately channeled into these specific activities.

(*c*) In CASE II some institution, agency, and geographic totals are understated as a result of omitted project records as mentioned above in the *Limitations* section.

(*d*) In many of the agencies, CASE I and CASE II data for fiscal year 1969 were provided by different offices using different information systems with varying degrees of automation and completeness. In many instances, the data collected from the disparate systems do not correspond exactly.

(2) *Federal Funds for Research, Development, and Other Scientific Activities* is an annual publication

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[2] Not elsewhere classified. This category includes multidisciplinary projects within the broad field and single-discipline projects for which a separate field has not been assigned.

that analyzes data on Federal obligations for research and development and R. & D. plant to each sector of the economy, including Government, industry, universities and colleges, and all other nonprofit organizations. Both the *Federal Funds* and the CASE II studies include data on Federal support of research by agency and field of science.

There are a number of major points of difference between the reports, however, involving both scope and emphasis. The *Federal Funds* report analyzes research and development and related data in terms of sector totals, type of research (basic and applied) and projected trends in Federal support levels. The CASE II study, on the other hand, covers the academic sector only, and collects data at the project level for individual institutions. The CASE II report includes data on the entire spectrum of academic science activities, of which "research and development" is but one component.

Derived totals for R. & D. obligations to all universities and colleges, by agency, do vary between the two studies. Specific reporting differences may be traced to one or more of the following reasons:

(*a*) Underreporting by some agencies in CASE II resulted in lower R. & D. figures.

(*b*) In *Federal Funds*, data were compiled from agency budgets in terms of aggregate sector totals. In CASE II data were generated from each agency's information system in terms of the smallest available reporting unit—the individual project.

(*c*) Tabulation of R. & D. totals for NIH and NSF in CASE II tended to be lower than those reported to *Federal Funds* due to the CASE II classification of certain broadly defined programs under the category, "general support for science." Some of these funds were directed into R. & D. activities and were reported as such in the *Federal Funds* study.

(*d*) In cases of interagency transfers of funds, the present study instructs the agency that actually obligates funds to an academic institution to report the total award including amounts transferred from other agencies. In *Federal Funds*, on the other hand, agencies from which the funds originate report separately amounts they obligate.

APPENDIX B

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TABLE B-1.—*Federal obligations for academic science, by agency and type of activity, fiscal year 1969*

[Dollars in thousands]

Agency	Total	Research and development	Manpower development	Facilities and equipment	General support for science	Research institutes, seminars, or conferences	Educational institutes, seminars, or conferences	Development of educational techniques and materials	Other related activities
Total, all agencies	$2,313,741	$1,296,997	$436,270	$274,798	$156,989	$1,805	$35,165	$15,272	$96,445
Department of Agriculture	155,643	63,352		1,171					91,120
Atomic Energy Commission	120,985	103,141	5,506	12,338					
Department of Commerce	1,905	1,408				100			397
Department of Defense	271,874	271,874							
Department of Health, Education, and Welfare	1,253,980	537,858	375,655	229,460	107,422	570		2,465	550
Department of the Interior	10,787	10,742							45
National Aeronautics and Space Administration	125,308	123,233	1,264	11			49		751
National Science Foundation	361,515	175,887	53,845	31,818	49,567	1,135	35,116	10,565	3,582
Office of Economic Opportunity	9,249	7,007						2,242	
Department of Labor	2,495	2,495							

SOURCE: National Science Foundation (CASE).

TABLE B-2.—*Federal obligations for academic science, by detailed field of science and type of activity, fiscal year 1969*

[Dollars in thousands]

Field of science	Total [1]	Research and development [1]	Manpower development	Facilities and equipment	General support for science	Research institutes, seminars, or conferences	Educational institutes, seminars, or conferences	Development of educational techniques and materials	Other related activities
Total, all fields	$2,313,741	$1,296,997	$436,270	$274,798	$156,989	$1,805	$35,165	$15,272	$96,445
Physical sciences, total	337,716	287,240	12,830	19,004	11,282	235	4,530	1,554	1,032
Astronomy	24,038	22,849	314	152	600	7	91	25	
Chemistry	99,240	76,126	9,084	4,058	7,283		1,632	462	595
Physics	201,328	179,113	3,341	13,053	2,383	225	1,736	1,067	437
Physical sciences, n.e.c.	13,113	9,161	121	1,741	1,016	3	1,071		
Mathematics	73,555	47,094	8,324	1,912	2,496	249	11,115	1,535	830
Environmental sciences, total	98,880	77,194	3,985	13,229	734	184	3,022	375	917
Atmospheric sciences	37,008	36,133	109	300		50	36	186	137
Geological sciences	30,972	25,878	795	2,776	136	34	685	123	545
Oceanography	18,192	8,801	89	9,141			125	66	
Environmental sciences, n.e.c.	12,711	5,635	2,955	1,012	598	100	2,176		235
Engineering, total	188,808	160,134	12,017	11,925	2,440	167	275	805	253
Aeronautical	10,420	10,137	130	25				128	
Astronautical	2,993	2,982	11						
Chemical	7,288	5,243	398	726	890			24	
Civil	14,810	12,672	1,300	687					51
Electrical	26,912	23,416	1,106	1,898	42	40		310	10
Mechanical	21,561	20,218	472	802		10			59
Metallurgy and materials	18,480	17,790	294	330			26	42	
Engineering, n.e.c.	37,177	26,973	8,346	7,259	1,508	117	249	301	133
Life sciences, total	918,464	532,398	225,831	47,304	106,892	127	3,721	1,812	379
Biological	376,234	305,593	66,674	3,804		11		107	45
Clinical medicine	470,728	185,286	148,122	33,707	103,365	66			209
Life sciences, n.e.c.	71,808	41,630	11,035	9,793	3,527	50	3,721	1,705	125

See footnote at end of table.

TABLE B–2.—*Federal obligations for academic science, by detailed field of science and type of activity, fiscal year 1969*—Continued

[Dollars in thousands]

Field of science	Total [1]	Research and development [1]	Manpower development	Facilities and equipment	General support for science	Research institutes, seminars, or conferences	Educational institutes, seminars, or conferences	Development of educational techniques and materials	Other related activities
Psychology, total	84, 684	54, 097	25, 965	2, 937	1, 077	21	103	484	----------
Biological aspects	28, 376	12, 859	15, 417	100	----------	----------	----------	----------	----------
Social aspects	19, 755	13, 492	3, 879	1, 900	----------	----------	----------	484	----------
Psychological sciences, n.e.c	36, 553	27, 746	6, 669	937	1, 077	21	103	----------	----------
Social sciences, total	86, 199	31, 185	38, 508	10, 752	810	294	1, 154	3, 036	460
Anthropology	7, 634	3, 960	3, 404	67	110	93	----------	----------	----------
Economics	7, 455	6, 255	704	16	229	11	204	5	31
History	1, 381	1, 063	255	10	----------	9	44	----------	----------
Linguistics	3, 197	2, 496	698	3	----------	----------	----------	----------	----------
Political science	4, 301	3, 687	390	----------	----------	111	----------	113	----------
Sociology	39, 087	10, 999	27, 099	8	25	----------	428	528	----------
Social sciences, n.e.c	23, 144	2, 725	5, 958	10, 648	446	70	478	2, 390	429
Other sciences, n.e.c	545, 537	129, 686	106, 840	167, 735	31, 258	528	11, 245	5, 671	92, 574

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[1] Data for R&D obligations and therefore, all programs, include imputations for some $105 million, representing grants and contracts for which the Department of Defense was unable to supply field of science breaks.

SOURCE: National Science Foundation (CASE).

Table B-3.—*Federal obligations for academic science, by detailed field of science and agency, fiscal year 1969*

[Dollars in thousands]

Field of science	Total	Department of Agriculture	Atomic Energy Commission	Department of Commerce	Department of Defense	Department of Health, Education, and Welfare	Department of the Interior	National Aeronautics and Space Administration	National Science Foundation	Office of Economic Opportunity	Department of Labor
Total, all fields	$2,313,741	$155,643	$120,985	$1,905	$271,874	$1,244,980	$19,787	$125,308	$361,515	$9,249	$2,495
Physical sciences, total	337,716	524	71.902	501	110.296	37,027	2,043	32,679	82,744		
Astronomy	24,038			305	7,728	37		9,433	6,535		
Chemistry	99,240	508	11,279	174	16,293	30,933	1,954	5,509	32,590		
Physics	201,325	5	60,479	22	86,275	3,123	89	9,848	41,484		
Physical sciences, n.e.c.	13,113	11	144			2,934		7,889	2,135		
Mathematics	73,555	5	3,888		17,275	10,807	326	3,904	37,350		
Environmental sciences, total	99,580	45	2,935	1,217	29,376	8,100	4,371	14,702	38,834		
Atmospheric sciences	37,008		850	600	14,935	1,052	889	7,180	11,502		
Geological sciences	30,669	10	524	194	11,821	1,682	3,075	2,392	10,971		
Oceanography	18,192		1,551	15	2,620	70	380		13,556		
Environmental sciences, n.e.c.	13,711	35	10	408		5,296	27	5,130	2,805		
Engineering, total	168,006	1,199	8,452	165	57,254	22,104	7,157	41,105	30,570		
Aeronautical	19,420		117		8,634		436	9,497	736		
Astronautical	2,873	514	11		1,057	36		1,255			
Chemical	7,293	277	120		516	1,260	458	111	4,551		
Civil	14,310	34		51	3,969	1,488	4,475	151	4,142		
Electrical	26,912		76		15,826	458	174	2,944	7,434		
Mechanical	21,561	42	90	59	6,777	494	152	8,550	5,397		
Metallurgy and materials	18,460	153	2,688		10,071	131	120	1,443	3,854		
Engineering, n.e.c.	57,177	179	5,350	55	10,404	18,237	1,342	17,154	4,456		
Life sciences, total	918,464	5,865	32,932		37,410	763,457	4,402	17,383	57,015		
Biological	376,234	5,272	27,436		31,453	289,803	4,237	14,913	3,120		
Clinical medicine	470,725	593	3,793		5,193	459,182	30	1,934			
Life sciences, n.e.c.	71,505		1,703		764	14,472	135	536	53,895		
Psychology total	84,684	104	9		10,579	64,135	45	273	9,401		138
Biological aspects	28,376		9		6,297	22,052		18			
Social aspects	19,755	104			2,740	16,073	44	[illegible]27	529		138
Psychological sciences, n.e.c.	36,553				1,542	26,010	1	[illegible]	8,872		
Social sciences, total	86,199	663			2,550	49,791	1,242	1,55[illegible]	18,902	9,249	2,250
Anthropology	7,634					3,846	382		3,406		
Economics	7,455	415				324	436	35	5,503		742
History	1,381					351	8	20	993		9
Linguistics	3,197				441	1,247		84	1,425		
Political science	4,301				1,331	226	145	395	2,188		16
Sociology	39,087	248			448	27,333	162	351	2,111	7,498	936
Social sciences, n.e.c.	23,144				330	16,464	109	667	3,276	1,751	547
Other sciences, n.e.c.	545,537	147,238	867	22	7,134	289,559	201	13,710	86,699		107

Source: National Science Foundation (CASE).

TABLE B-4.—*Federal obligations for academic science to universities and colleges receiving the largest amounts, ranked in various groups, by type of activity, fiscal year 1969*

[Dollars in thousands]

Number of institutions (ranked in order of academic science obligations)	Total	Research and development	Manpower development	Facilities and equipment	General support for science	Research institutes, seminars, or conferences	Educational institutes, seminars, or conferences	Development of educational techniques and materials	Other related activities
Total, all institutions:									
Amount of obligations	$2, 313, 741	$1, 296, 997	$436, 270	$274, 798	$156, 989	$1, 805	$35, 165	$15, 272	$96, 445
Percent of total	100. 00	100. 00	100. 00	100. 00	100. 00	100. 00	100. 00	100. 00	100. 00
First 10:									
Amount of obligations	507, 549	352, 948	87, 727	39, 637	11, 970	273	1, 811	3, 522	9, 661
Percent of total	21. 94	27. 21	20. 11	14. 42	7. 62	15. 12	5. 15	23. 06	10. 02
Second 10:									
Amount of obligations	338, 145	193, 582	69, 253	51, 564	15, 941	69	805	1, 294	5, 637
Percent of total	14. 61	14. 93	15. 87	18. 76	10. 15	3. 82	2. 29	8. 47	5. 84
Third 10:									
Amount of obligations	233, 297	118, 103	45, 606	36, 489	20, 899	196	1, 564	1, 265	9, 175
Percent of total	10. 08	9. 11	10. 45	13. 28	13. 31	10. 86	4. 45	8. 28	9. 51
Fourth 10:									
Amount of obligations	189, 330	115, 720	41, 112	12, 143	9, 858	416	1, 588	938	7, 555
Percent of total	8. 18	8. 92	9. 42	4. 42	6. 28	23. 05	4. 52	6. 14	7. 83
Fifth 10:									
Amount of obligations	141, 437	72, 791	29, 099	14, 664	12, 398	113	1, 582	1, 481	9, 309
Percent of total	6. 11	5. 61	6. 67	5. 34	7. 90	6. 26	4. 50	9. 70	9. 65
First 50:									
Amount of obligations	1, 409, 758	853, 144	272, 797	154, 497	71, 066	1, 067	7, 350	8, 500	41, 337
Percent of total	60. 93	65. 78	62. 53	56. 22	45. 27	59. 11	20. 90	55. 66	42. 86
Second 50:									
Amount of obligaions	460, 050	253, 176	91, 492	46, 294	30, 698	329	6, 805	1, 988	29, 268
Percent of total	19. 88	19. 52	20. 97	16. 85	19. 55	18. 23	19. 35	13. 02	30. 35
First 100:									
Amount of obligations	1, 869, 808	1, 106, 320	364, 289	200, 791	101, 764	1, 396	14, 155	10, 488	70, 605
Percent of total	80. 81	85. 30	83. 50	73. 07	64. 82	77. 34	40. 25	68. 67	73. 21
Allother:									
Amount of obligations	443, 933	190, 677	71, 981	74, 007	55, 225	409	21, 010	4, 784	25, 840
Percent of total	19. 19	14. 70	16. 50	26. 93	35. 18	22. 66	59. 75	31. 33	26. 79

SOURCE: National Science Foundation (CASE).

Table B-5.—*Federal obligations for academic science to 100 universities and colleges receiving the largest amounts, by type of activity, fiscal year 1969*

[Dollars in thousands]

Institution (in order of academic science obligations)	State	Total	Research and development	Manpower development	Facilities and equipment	General support for science	Research institutes, seminars, or conferences	Educational institutes, seminars, or conferences	Development of educational techniques and materials	Other related activities
Total, 100 institutions		$1,869,808	$1,106,320	$364,289	$200,791	$101,764	$1,396	$14,155	$10,488	$70,605
1. Massachusetts Institute of Technology	Mass.	86,310	77,372	5,114	3,350	250	6	6	68	144
2. Harvard University	Mass.	62,884	38,193	12,374	10,846	1,229	10	131	91	10
3. University of Michigan	Mich.	50,494	36,012	10,204	1,316	2,531	96	134	200	1
4. Stanford University	Calif.	46,854	33,456	9,488	1,759	759	26	58	750	558
5. University of California—Los Angeles	Calif.	45,523	32,503	9,115	1,872	1,784	----	41	----	208
6. University of Washington	Wash.	45,277	22,070	10,202	11,439	1,034	10	187	66	269
7. University of California—Berkeley	Calif.	44,341	28,455	8,430	958	1,500	----	384	1,610	3,004
8. Columbia University[1]	N.Y.	43,866	28,838	9,394	3,872	1,502	----	49	211	----
9. University of Illinois—Urbana	Ill.	41,357	30,685	4,952	1,065	506	23	619	516	2,991
10. University of Wisconsin—Madison	Wis.	40,643	25,364	8,454	3,160	875	102	202	10	2,476
11. University of Minnesota	Minn.	38,721	24,306	9,330	303	1,826	10	119	411	2,416
12. New Jersey College of Medicine & Dentistry	N.J.	36,691	582	330	35,301	478	----	----	----	----
13. Cornell University	N.Y.	35,952	24,119	5,777	1,453	1,214	----	259	161	2,969
14. New York University	N.Y.	35,921	19,287	7,587	1,902	6,822	32	50	241	----
15. University of Chicago	Ill.	35,668	23,373	9,856	1,481	714	----	30	214	----
16. University of Pennsylvania	Pa.	34,198	21,271	9,303	1,884	1,168	----	245	263	64
17. University of California—San Diego	Calif.	31,352	24,576	2,175	4,290	311	----	----	----	----
18. Johns Hopkins University	Md.	30,892	20,135	8,838	333	1,401	13	----	----	172
19. Yale University	Conn.	30,867	20,715	8,468	533	1,137	----	----	4	10
20. Duke University	N.C.	27,883	15,218	7,589	4,084	870	14	102	----	6
21. Ohio State University	Ohio	27,404	11,842	4,888	5,122	1,673	17	354	73	3,435
22. Washington University	Mo.	25,676	14,008	6,137	1,045	4,306	----	----	----	180
23. University of Massachusetts	Mass.	25,636	4,446	1,191	18,896	173	----	45	----	885
24. University of Southern California	Calif.	23,005	12,695	4,632	701	4,382	36	114	101	344
25. Case Western Reserve University	Ohio	22,677	13,860	6,127	922	1,719	11	38	----	----
26. University of Pittsburgh	Pa.	22,567	11,430	4,957	122	5,097	55	63	459	384
27. University of Maryland	Md.	22,335	13,528	3,630	2,120	1,433	7	291	191	1,135
28. Yeshiva University	N.Y.	21,433	12,226	5,315	3,003	710	----	125	----	54
29. Michigan State University	Mich.	21,334	9,199	3,892	3,866	691	52	435	441	2,758
30. University of Rochester	N.Y.	21,230	14,869	4,837	692	715	18	99	----	----
31. University of North Carolina—Chapel Hill	N.C.	20,828	10,887	6,942	960	1,757	8	270	----	4
32. University of California—San Francisco	Calif.	20,417	12,799	6,374	104	1,140	----	----	----	----
33. University of Colorado	Colo.	20,372	11,500	5,870	1,591	906	250	19	163	73
34. California Institute of Technology	Calif.	20,339	14,481	2,359	3,249	114	----	----	126	10
35. Purdue University	Ind.	19,962	12,616	3,529	533	255	----	428	113	2,488

36. Pennsylvlana State University	Pa.	18,011	10,138	2,985	214	317	8	438	392	3,519
37. Princeton University	N.J.	17,934	13,887	2,584	1,283	81		25	74	
38. University of Utah	Utah	17,382	10,267	3,719	1,509	1,688		171	28	
39. University of Florida	Fla.	17,323	8,115	4,357	358	2,669	93	228	42	1,461
40. University of Miami	Fla.	16,762	11,030	2,393	2,342	931	57	9		
41. Northwestern University	Ill.	16,006	8,901	4,475	1,178	1,372	7	73		
42. University of Arizona	Ariz.	15,447	8,464	1,945	541	3,526	21	184	100	666
43. University of Iowa	Iowa	14,891	9,124	4,201	131	867	47	255	240	26
44. Indiana University—Indianapolis	Ind.	13,817	3,699	1,976	7,703	439				
45. Rutgers, The State University	N.J.	13,759	8,264	2,689	1,101	472		404		829
46. North Carolina State University—Raleigh	N.C.	13,745	6,567	1,406	833	78		45	107	4,709
47. Tulane University	La.	13,590	5,765	4,354	1,739	1,301		51	380	
48. University of Kentucky	Ky.	13,545	7,347	1,674	536	909			12	3,067
49. University of Texas—Austin	Tex.	13,442	9,106	3,235	49	162	20	356	502	12
50. University of Virginia	Va.	13,195	5,554	3,144	853	3,272	18	214	140	
51. University of California—Davis	Calif.	12,584	8,063	2,155	1,809	500	22			35
52. Vanderbilt University	Tenn.	12,566	7,179	2,958	1,832	567				30
53. University of Oregon	Oreg.	12,540	6,292	3,935	1,268	535	3	417	90	
54. University of Tennessee	Tenn.	12,479	6,282	1,863	897	190	8	8		3,231
55. University of Georgia	Ga.	12,331	5,744	2,164	603	287		332		3,201
56. University of Missouri-Columbia	Mo.	12,084	6,086	3,084	1,308	1,466	2	110	9	19
57. Baylor University	Tex.	12,033	8,055	2,936	338	668		36		
58. University of Kansas	Kans.	11,982	6,705	3,710	675	465		61	366	
59. University of Illinois Medical Center	Ill.	11,938	3,741	2,432	5,382	383				
60. Texas A&M University	Tex.	11,699	7,448	919	2,088	647		318	149	130
61. University of Hawaii	Hawaii	11,596	7,870	1,352	1,202	524	11	208		429
62. Oregon State University	Oreg.	11,581	6,495	1,659	904	922		378	152	1,071
63. SUNY State University—Buffalo	N.Y.	11,144	7,060	3,266	8	648		59	42	61
64. Temple University	Pa.	11,074	4,243	2,377	2,687	1,461		149	157	
65. University of Alabama—Birmingham	Ala.	10,885	5,361	2,047	2,323	1,125			29	
66. Indiana University-Bloomington	Ind.	10,751	5,786	3,071	369	1,282		242		1
67. Boston University	Mass.	10,231	4,635	4,544	11	965		51	25	
68. Iowa State University	Iowa	10,034	5,168	1,337	742	249	5	74		2,459
69. University of Cincinnati	Ohio	10,003	5,050	2,972	963	861	6	151		
70. Syracuse University	N.Y.	9,966	6,508	1,925	882	66		373	192	20
71. CUNY Mt. Sinai School of Medicine	N.Y.	9,786	7,142	2,254	5	385				
72. Florida State University	Fla.	9,564	5,677	2,388	350	121	7	401	620	
73. Brown University	R. I.	9,403	6,358	1,722	824	246		241		12
74. Emory University	Ga.	9,095	3,554	3,269	1,162	1,009		71	30	
75. University of Vermont	Vt.	9,091	3,463	1,075	3,236	773	8	73		463
76. Colorado State University	Colo.	9,024	5,999	1,226	270	376	47	97	19	990
77. University of Arkansas	Ark.	8,276	3,454	1,190	211	804		223		2,394
78. Kansas State University	Kans.	8,275	3,188	1,187	1,000	1,012		197	10	1,681
79. University of Alaska	Alaska	8,207	7,505	198	116	69		67		252
80. Rice University	Tex.	8,011	6,294	1,174	460	83				

See footnotes at end of table.

TABLE B–5.—*Federal obligations for academic science to 100 universities and colleges receiving the largest amounts, by type of activity, fiscal year 1969*—Continued

[Dollars in thousands]

Institution (in order of academic science obligations)	State	Total	Research and development	Manpower development	Facilities and equipment	General support for science	Research institutes, seminars, or conferences	Educational institutes, seminars, or conferences	Development of educational techniques and materials	Other related activities
81. Albany Medical College	N.Y.	$7,784	$1,992	$850	$4,157	$785				
82. University of New Mexico	N. Mex.	7,743	6,055	758	341	520		$69		
83. Oklahoma State University	Okla.	7,678	3,637	817	74	889		218		$2,043
84. George Washington University	D.C.	7,623	5,187	1,003	642	747		44		
85. West Virginia University	W. Va.	7,565	3,522	1,425	99	898		25		1,596
86. Virginia Polytechnic Institute	Va.	7,434	3,056	807	818	75	$34			2,644
87. University of Nebraska—Lincoln	Nebr.	7,384	2,119	990	420	2,271		92	$89	1,403
88. University of Notre Dame	Ind.	7,378	4,832	988	1,009	99		450		
89. University of Connecticut	Conn.	7,327	4,455	1,690	332	195		94		561
90. Wayne State University	Mich.	7,303	3,346	2,926	88	730	16	197		
91. Louisiana State University-Baton Rouge	La.	7,228	3,536	722	195	378		300		2,097
92. University of Oklahoma	Okla.	7,010	2,997	2,654	198	506		614		41
93. University of Texas—M.D. Anderson Hospital & Tumor Institute	Tex.	6,849	5,320	664	6	724	135			
94. University of Texas-Southwestern Medical School	Tex.	6,802	3,581	2,359		862				
95. Tufts University	Mass.	6,744	3,822	1,992	99	791			5	35
96. Carnegie Mellon University	Pa.	6,615	5,595	897		64				59
97. Georgetown University	D.C.	6,385	3,214	1,940	58	1,173				
98. Washington State University	Wash.	6,361	3,455	1,002	235	255	16	144		1,254
99. University of Delaware	Del.	6,337	2,221	422	3,229			162		303
100. New Mexico State University	N. Mex.	6,267	4,829	197	369	47	9	59	4	753

[1] Main university only.

SOURCE: National Science Foundation (CASE).

TABLE B-6.—*Federal R. & D. obligations to universities and colleges, by agency and field of science, fiscal year 1969*

[Dollars in thousands]

Agency	Total	Physical sciences	Mathematics	Environmental sciences	Engineering	Life sciences	Psychology	Social sciences	Other sciences, n.e.c.
Total, all agencies:[1]									
Amount of obligations	$1,296,997	$287,249	$47,094	$77,164	$140,124	$530,398	$54,097	$31,185	$129,686
Percent of U.S. total	100.00	22.15	3.63	5.95	10.80	40.89	4.17	2.40	10.00
Department of Agriculture:									
Amount of obligations	63,352	524	5	45	1,199	5,865	104	663	54,947
Percent of agency total	100.00	.83	.01	.07	1.89	9.26	.16	1.05	86.73
Atomic Energy Commission:									
Amount of obligations	103,141	61,154	3,789	2,920	5,944	29,269	9		56
Percent of agency total	100.00	59.29	3.67	2.83	5.76	28.38	.01		.05
Department of Commerce:									
Amount of obligations	1,408	305		1,103					
Percent of agency total	100.00	21.66		78.34					
Department of Defense:[1]									
Amount of obligations	271,874	110,296	17,275	29,376	57,254	37,410	10,579	2,550	7,134
Percent of agency total	100.00	40.57	6.35	10.81	21.06	13.76	3.89	.94	2.62
Department of Health, Education, and Welfare:									
Amount of obligations	528,858	25,898	6,754	2,326	7,598	396,240	36,728	3,568	49,746
Percent of agency total	100.00	4.90	1.28	.44	1.44	74.92	6.94	.67	9.41
Department of the Interior:									
Amount of obligations	19,742	2,043	326	4,371	7,157	4,357	45	1,242	201
Percent of agency total	100.00	10.35	1.65	22.14	36.25	22.07	.23	6.29	1.02
National Aeronautics and Space Administration:									
Amount of obligations	123,233	32,619	3,904	14,028	40,656	17,383	273	1,540	12,830
Percent of agency total	100.00	26.47	3.17	11.38	32.99	14.11	.22	1.25	10.41
National Science Foundation:									
Amount of obligations	175,887	54,410	15,041	22,995	20,316	39,874	6,221	12,365	4,665
Percent of agency total	100.00	30.93	8.55	13.07	11.55	22.67	3.54	7.03	2.65
Office of Economic Opportunity:									
Amount of obligations	7,007							7,007	
Percent of agency total	100.00							100.00	
Department of Labor:									
Amount of obligations	2,495						138	2,250	107
Percent of agency total	100.00						5.53	90.18	4.29

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[1] Data for R&D obligations and therefore, all fields, include imputations for some $105 million, representing grants and contracts for which the Department of Defense was unable to supply field of science breaks.

SOURCE: National Science Foundation (CASE).

Table B-7.—*Federal R. & D. obligations to universities and colleges, by detailed field of science and agency, fiscal year 1969*

[Dollars in thousands]

Field of science	Total[1]		USDA	AEC	Commerce	DOD[1]	HEW	Interior	NASA	NSF	OEO	Labor
	Amount	Percent of total										
Total, all fields	$1,296,997	100.00	$63,352	$103,141	$1,408	$271,874	$528,858	$19,742	$123,233	$175,887	$7,007	$2,495
Percent of field total	100.00	--------	4.88	7.95	.11	20.96	40.78	1.52	9.50	13.56	.54	.19
Physical sciences	287,249	22.15	524	61,154	305	110,296	25,898	2,043	32,619	54,410	--------	--------
Percent of field total	100.00	--------	.18	21.29	.11	38.40	9.02	.71	11.36	18.94	--------	--------
Astronomy	22,849	1.76	--------	--------	305	7,728	37	--------	9,433	5,346	--------	--------
Percent of field total	100.00	--------	--------	--------	1.33	33.82	.16	--------	41.28	23.40	--------	--------
Chemistry	76,126	5.87	508	10,426	--------	16,293	23,700	1,954	5,509	17,736	--------	--------
Percent of field total	100.00	--------	.67	13.70	--------	21.40	31.13	2.57	7.24	23.30	--------	--------
Physics	179,113	13.81	5	50,698	--------	86,275	919	89	9,799	31,328	--------	--------
Percent of field total	100.00	--------	(2)	28.31	--------	48.17	.51	.05	5.47	17.49	--------	--------
Physical sciences, n.e.c	9,161	.71	11	30	--------	--------	1,242	--------	7,878	--------	--------	--------
Percent of field total	100.00	--------	.12	.33	--------	--------	13.56	--------	85.99	--------	--------	--------
Mathematics	47,094	3.63	5	3,789	--------	17,275	6,754	326	3,904	15,041	--------	--------
Percent of field total	100.00	--------	.01	8.05	--------	36.68	14.34	.69	8.29	31.94	--------	--------
Environmental sciences	77,164	5.95	45	2,920	1,103	29,376	2,326	4,371	14,028	22,995	--------	--------
Percent of field total	100.00	--------	.06	3.78	1.43	38.07	3.01	5.66	18.18	29.80	--------	--------
Atmospheric sciences	36,133	2.79	--------	850	600	14,935	865	889	7,081	10,913	--------	--------
Percent of field total	100.00	--------	--------	2.35	1.66	41.33	2.39	2.46	19.60	30.20	--------	--------
Geological sciences	25,575	1.97	10	524	194	11,821	77	3,075	1,972	7,902	--------	--------
Percent of field total	100.00	--------	.04	2.05	.76	46.22	.30	12.02	7.71	30.90	--------	--------
Oceanography	8,801	.68	--------	1,546	15	2,620	60	380	--------	4,180	--------	--------
Percent of field total	100.00	--------	--------	17.57	.17	29.77	.68	4.32	--------	47.49	--------	--------
Environmental sciences, n.e.c	6,655	.51	35	--------	294	--------	1,324	27	4,975	--------	--------	--------
Percent of field total	100.00	--------	.53	--------	4.42	--------	19.89	.41	74.76	--------	--------	--------
Engineering	140,124	10.80	1,199	5,944	--------	57,254	7,598	7,157	40,656	20,316	--------	--------
Percent of field total	100.00	--------	.86	4.24	--------	40.86	5.42	5.11	29.01	14.50	--------	--------
Aeronautical	19.137	1.48	--------	117	--------	8,634	--------	436	9,497	453	--------	--------
Percent of field total	100.00	--------	--------	.61	--------	45.12	--------	2.28	49.63	2.37	--------	--------
Astronautical	2,862	.22	514	--------	--------	1,057	36	--------	1,255	--------	--------	--------
Percent of field total	100.00	--------	17.96	--------	--------	36.93	1.26	--------	43.85	--------	--------	--------
Chemical	5,545	.43	277	60	--------	516	555	458	111	3,568	--------	--------
Percent of field total	100.00	--------	5.00	1.08	--------	9.31	10.01	8.26	2.00	64.35	--------	--------
Civil	12,072	.93	34	--------	--------	3,969	234	4,475	151	3,209	--------	--------
Percent of field total	100.00	--------	.28	--------	--------	32.88	1.94	37.07	1.25	26.58	--------	--------
Electrical	23,518	1.81	--------	70	--------	15,826	--------	174	2,944	4,504	--------	--------
Percent of field total	100.00	--------	--------	.30	--------	67.29	--------	.74	12.52	19.15	--------	--------
Mechanical	20,218	1.56	42	68	--------	6,777	138	152	8,550	4,491	--------	--------
Percent of field total	100.00	--------	.21	.34	--------	33.52	.68	.75	42.29	22.21	--------	--------
Metallurgy and materials	17,799	1.37	153	2,649	--------	10,071	63	120	1,443	3,300	--------	--------
Percent of field total	100.00	--------	.86	14.88	--------	56.58	.35	.67	8.11	18.54	--------	--------
Engineering, n.e.c	38,973	3.00	179	2,980	--------	10,404	6,572	1,342	16,705	791	--------	--------
Percent of field total	100.00	--------	.46	7.65	--------	26.70	16.86	3.44	42.86	2.03	--------	--------

See footnotes at end of table.

TABLE B-7.—*Federal R. & D. obligations to universities and colleges, by detailed field of science and agency, fiscal year 1969*—Continued

Field of science	Total[1]		USDA	AEC	Commerce	DOD[1]	HEW	Interior	NASA	NSF	OEO	Labor
	Amount	Percent of total										
Life sciences	$530,398	40.89	$5,865	$29,269	-----	$37,410	$396,240	$4,357	$17,383	$39,874	-----	-----
Percent of field total	100.00	-----	1.11	5.52	-----	7.05	74.71	.82	3.28	7.52	-----	-----
Biological	303,503	23.40	5,272	25,862	-----	31,453	221,811	4,192	14,913	-----	-----	-----
Percent of field total	100.00	-----	1.74	8.52	-----	10.36	73.08	1.38	4.91	-----	-----	-----
Clinical medicine	185,256	14.28	593	3,383	-----	5,193	174,123	30	1,934	-----	-----	-----
Percent of field total	100.00	-----	.32	1.83	-----	2.80	93.99	.02	1.04	-----	-----	-----
Life sciences, n.e.c	41,639	3.21	-----	24	-----	764	306	135	536	39,874	-----	-----
Percent of field total	100.00	-----	-----	.06	-----	1.83	.73	.32	1.29	95.76	-----	-----
Psychology	54,097	4.17	104	9	-----	10,579	36,728	45	273	6,221	-----	$138
Percent of field total	100.00	-----	.19	.02	-----	19.56	67.89	.08	.50	11.50	-----	.26
Biological aspects	12,859	.99	-----	9	-----	6,297	6,535	-----	18	-----	-----	-----
Percent of field total	100.00	-----	-----	.07	-----	48.97	50.82	-----	.14	-----	-----	-----
Social aspects	13,492	1.04	104	-----	-----	2,740	10,339	44	127	-----	-----	138
Percent of field total	100.00	-----	.77	-----	-----	20.31	76.63	.33	.94	-----	-----	1.02
Psychological sciences, n.e.c	27,746	2.14	-----	-----	-----	1,542	19,854	1	128	6,221	-----	-----
Percent of field total	100.00	-----	-----	-----	-----	5.56	71.56	(2)	.46	22.42	-----	-----
Social sciences	31,185	2.40	663	-----	-----	2,550	3,568	1,242	1,540	12,365	$7,007	2,250
Percent of field total	100.00	-----	2.13	-----	-----	8.18	11.44	3.98	4.94	39.65	22.47	7.22
Anthropology	3,960	.31	-----	-----	-----	-----	820	382	-----	2,758	-----	-----
Percent of field total	100.00	-----	-----	-----	-----	-----	20.71	9.65	-----	69.65	-----	-----
Economics	6,255	.48	415	-----	-----	-----	220	436	23	4,419	-----	742
Percent of field total	100.00	-----	6.63	-----	-----	-----	3.52	6.97	.37	70.65	-----	11.86
History	1,063	.08	-----	-----	-----	-----	266	8	20	760	-----	9
Percent of field total	100.00	-----	-----	-----	-----	-----	25.02	.75	1.88	71.50	-----	.85
Linguistics	2,496	.19	-----	-----	-----	441	692	-----	84	1,279	-----	-----
Percent of field total	100.00	-----	-----	-----	-----	17.67	27.72	-----	3.37	51.24	-----	-----
Political science	3,687	.28	-----	-----	-----	1,331	204	145	395	1,596	-----	16
Percent of field total	100.00	-----	-----	-----	-----	36.10	5.53	3.93	10.71	43.29	-----	.43
Sociology	10,999	.85	248	-----	-----	448	459	162	351	1,388	7,007	936
Percent of field total	100.00	-----	2.25	-----	-----	4.07	4.18	1.47	3.19	12.62	63.71	8.51
Social sciences, n.e.c	2,725	.21	-----	-----	-----	330	907	109	667	165	-----	547
Percent of field total	100.00	-----	-----	-----	-----	12.11	33.28	4.00	24.48	6.05	-----	20.07
Other sciences, n.e.c	129,686	10.00	54,947	56	-----	7,134	49,746	201	12,830	4,665	-----	107
Percent of field total	100.00	-----	42.37	.04	-----	5.50	38.36	.15	9.89	3.60	-----	.08

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[1] Data for Department of Defense R. & D. obligations and therefore the U.S. total include imputations for some $105 million representing grants and contracts for which DOD was unable to supply field of science breaks.

[2] Less than .005 percent.

SOURCE: National Science Foundation (CASE).

TABLE B-8.—*Federal R. & D. obligations to universities and colleges, by geographic division, State, and agency, fiscal year 1969*

[Dollars in thousands]

Division and State	Total	Department of Agriculture	Atomic Energy Commission	Department of Commerce	Department of Defense	Department of Health, Education, and Welfare	Department of the Interior	National Aeronautics and Space Administration	National Science Foundation	Office of Economic Opportunity	Department of Labor
United States, total	$1,296,997	$63,352	$103,141	$1,408	$271,874	$528,858	$19,742	$123,233	$175,887	$7,007	$2,495
New England	185,096	3,482	14,739	89	55,658	55,923	1,520	32,527	19,665	1,262	231
Maine	971	717			62	48	80		58		6
New Hampshire	5,916	537	52		461	2,174	124	2,091	477		
Vermont	3,520	608	75		462	2,041	71	140	123		
Massachusetts	139,525	751	10,442	89	48,798	35,156	939	29,297	12,615	1,262	176
Rhode Island	8,926	531	591		3,284	2,530	104	179	1,707		
Connecticut	26,238	338	3,579		2,591	13,974	202	820	4,685		49
Middle Atlantic	243,655	4,507	24,266	90	41,650	118,602	2,056	13,299	37,859	445	791
New York	153,762	1,792	16,006	90	24,297	82,724	1,435	4,932	21,532	400	554
New Jersey	25,271	835	3,128		4,875	5,869	143	4,197	6,181		43
Pennsylvania	64,622	1,880	5,132		12,478	30,099	478	4,170	10,146	45	194
East North Central	219,377	8,918	23,178	194	48,762	83,275	2,519	11,951	36,672	2,934	974
Ohio	36,573	1,837	2,056		9,328	16,278	472	1,634	4,658	15	295
Indiana	26,996	1,954	3,203	6	4,791	8,773	250	1,153	6,866		
Illinois	74,246	1,686	9,643	56	20,442	24,844	734	3,985	12,338	397	121
Michigan	49,918	1,786	5,038	25	12,573	19,111	570	3,283	6,984	140	408
Wisconsin	31,644	1,655	3,238	107	1,628	14,269	493	1,896	5,826	2,382	150
West North Central	80,704	8,935	3,279		12,002	39,405	2,050	5,912	8,946	123	52
Minnesota	24,411	1,617	1,672		2,916	11,830	438	2,379	2,426	123	10
Iowa	14,357	1,768	245		2,811	6,369	184	1,240	1,733		7
Missouri	23,813	1,706	554		3,860	14,560	129	660	2,309		35
North Dakota	2,375	807	45		1,185	171	97	13	57		
South Dakota	2,402	766	46		113	175	814	18	470		
Nebraska	3,316	1,152	85		70	1,521	77		411		
Kansas	10,030	1,119	632		1,047	4,779	311	602	1,540		
South Atlantic	145,417	10,575	8,320	247	29,556	68,127	3,594	8,589	16,192	67	150
Delaware	2,233	482	65		948	275	115	27	321		
Maryland	33,716	828	2,962	50	5,641	18,150	321	2,218	3,537		9
District of Columbia	13,961		208	7	4,756	6,434	66	1,163	1,215	25	87
Virginia	12,162	1,475	378		2,104	5,484	187	1,335	1,199		
West Virginia	3,522	995			658	1,237	249	190	193		
North Carolina	35,128	2,636	1,869		5,539	19,136	1,087	1,330	3,531		
South Carolina	3,891	1,267	127		737	1,247	164	71	278		
Georgia	14,524	1,952	944		2,213	6,041	395	1,146	1,823		10
Florida	26,280	940	1,767	190	6,960	10,123	1,010	1,109	4,095	42	44

East South Central	41,839	7,517	2,085		6,005	21,244	640	2,222	1,894	220	12
Kentucky	9,451	2,455	225		2,138	3,651	171	246	553		12
Tennessee	17,344	1,589	1,776		2,255	9,791	108	659	946	220	
Alabama	9,798	1,781	65		1,105	5,431	279	936	201		
Mississippi	5,246	1,692	19		507	2,371	82	381	194		
West South Central	76,357	6,660	3,278	96	13,760	32,447	1,213	10,661	7,906	182	154
Arkansas	3,549	1,554	167		27	1,290	127	188	196		
Louisiana	11,484	1,255	320		1,058	6,396	87	603	1,750		15
Oklahoma	6,879	1,226	96	67	1,488	2,492	239	288	858		125
Texas	54,445	2,625	2,695	29	11,187	22,269	760	9,582	5,102	182	14
Mountain	63,143	5,763	3,271	557	19,136	15,947	2,684	7,102	8,167	502	14
Montana	2,105	774	81		178	467	372	22	211		
Idaho	1,203	719	10		178	24	139		133		
Wyoming	1,604	533	72	26	10	132	165	314	352		
Colorado	21,127	968	1,193	491	3,768	7,462	739	3,024	3,482		
New Mexico	11,784	649	39	18	6,283	1,263	282	1,808	960	482	
Arizona	9,520	875	542		3,277	1,472	249	1,421	1,684		
Utah	13,995	800	1,096		5,203	5,054	340	379	1,089	20	14
Nevada	1,805	445	238	22	239	73	398	134	256		
Pacific	237,161	5,564	19,822	135	45,284	92,142	3,403	30,854	38,568	1,272	117
Washington	25,857	1,307	2,618		2,964	13,044	752	603	4,556		13
Oregon	13,770	1,050	1,029	15	2,166	6,020	980	220	1,986	304	
California	182,088	2,197	15,387	35	34,120	70,149	1,351	28,248	29,529	968	104
Alaska	7,576	523	271	25	3,678	487	192	763	1,637		
Hawaii	7,870	487	517	60	2,356	2,442	128	1,020	860		
Outlying areas [1]	4,248	1,431	903		61	1,656	63	116	18		

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[1] Includes Puerto Rico, Virgin Islands, and Guam. The amounts to the Virgin Islands and Guam were a small fraction of the total.

SOURCE: National Science Foundation (CASE).

TABLE B-9.—*Federal R. & D. obligations to the 100 universities and colleges receiving the largest amounts, by agency, fiscal year 1969*

[Dollars in thousands]

Institution (in order of R. & D. obligations)	State	Total obligations	Percent of U.S. total	Percent of Ph. D. degrees in science and engineering, 1967–68	Department of Agriculture	Atomic Energy Commission	Department of Commerce	Department of Defense	Department of Health, Education, and Welfare	Department of the Interior	National Aeronautics and Space Administration	National Science Foundation	Office of Economic Opportunity	Department of Labor
Total, 100 institutions		$1,116,546	86.09	86.75	$45,700	$95,996	$1,117	$232,086	$462,934	$13,309	$107,416	$152,603	$2,350	$2,345
1. Massachusetts Institute of Technology	Mass.	77,372	5.97	2.36		7,279	80	40,274	7,341	278	17,560	4,517		43
2. Harvard University	Mass.	38,193	2.94	2.00		1,805		3,038	17,235	236	10,385	4,701	709	84
3. University of Michigan	Mich.	36,012	2.78	2.48	167	2,768	25	11,317	13,398	273	3,141	4,538	68	317
4. Stanford University	Calif.	33,456	2.58	2.27		607	12	10,359	11,508	221	4,874	5,851		24
5. University of California—Los Angeles	Calif.	32,503	2.51	1.83		4,580	23	2,008	14,477	125	8,108	2,900	270	12
6. University of Illinois—Urbana	Ill.	30,685	2.37	3.00	1,654	4,476		14,745	5,030	335	850	3,465	105	25
7. Columbia University[1]	N.Y.	28,838	2.22	1.87		4,618	21	6,347	13,066	28	682	4,046		30
8. University of California—Berkeley	Calif.	28,455	2.19	3.64	2,137	495		4,356	8,348	194	5,978	6,543	287	45
9. University of Wisconsin—Madison	Wis.	25,364	1.96	3.24	1,655	3,177	107	1,064	12,203	408	1,037	5,563		150
10. University of California—San Diego	Calif.	24,576	1.89	.38		2,316		9,242	5,155	80	3,985	3,798		
11. University of Minnesota	Minn.	24,306	1.87	2.11	1,613	1,672		2,916	11,792	436	3,379	2,365	123	10
12. Cornell University	N.Y.	24,119	1.86	2.13	1,677	1,698		5,385	7,982	718	715	5,639		305
13. University of Chicago	Ill.	23,373	1.80	1.47		4,577	56	1,706	9,233		2,340	5,386		75
14. University of Washington	Wash.	22,070	1.70	1.37	125	2,356		2,647	11,814	554	584	3,977		13
15. University of Pennsylvania	Pa.	21,271	1.64	1.27		1,823		3,040	12,626		545	3,123		114
16. Yale University	Conn.	20,715	1.60	1.03		3,432		1,759	11,495		356	3,624		49
17. Johns Hopkins University	Md.	20,135	1.55	1.08		959	31	2,986	14,005	21	426	1,698		9
18. New York University	N.Y.	19,287	1.49	1.38		1,977	42	2,844	12,182		562	1,484	100	96
19. Duke University	N.C.	15,218	1.17	.81	1	861		3,465	9,024	13	128	1,726		
20. University of Rochester	N.Y.	14,869	1.15	.80		4,778		1,111	6,455		383	2,142		
21. California Institute of Technology	Calif.	14,481	1.12	.78		2,592		3,097	3,115	124	2,291	3,262		
22. Washington University	Mo.	14,008	1.08	.69		387		2,236	10,014		207	1,129		35
23. Princeton University	N.J.	13,887	1.07	1.08		2,727		3,013	1,463		3,423	3,250		11
24. Case Western Reserve University	Ohio	13,860	1.07	1.22		1,146		2,133	8,290	54	876	1,301		60
25. University of Maryland	Md.	13,528	1.04	1.17	828	2,003	19	2,640	4,129	300	1,780	1,829		
26. University of California—San Francisco	Calif.	12,799	.99	.19		605		408	11,419		116	251		
27. University of Southern California	Calif.	12,695	.98	.86		676		2,440	6,692		1,251	1,636		
28. Purdue University	Ind.	12,616	.97	2.32	1,954	1,553	6	3,392	2,386	204	579	2,542		
29. Yeshiva University	N.Y.	12,226	.94	.24		135		694	10,292		267	838		
30. Ohio State University	Ohio	11,842	.91	1.86	1,778	700		1,532	4,566	118	468	2,472		208
31. University of Colorado	Colo.	11,500	.89	.96		902	305	1,372	6,046	54	1,482	1,339		
32. University of Pittsburgh	Pa.	11,430	.88	.63		513		1,652	6,074		1,324	1,867		
33. University of Miami	Fla.	11,030	.85	.23		413	65	2,578	4,998	467	671	1,838		
34. University of North Carolina—Chapel Hill	N.C.	10,887	.84	.76		508		964	6,946	816	508	1,145		
35. University of Utah	Utah	10,267	.79	.62	5	1,001		3,769	4,433	12	315	698	20	14

36. Pennsylvania State University	Pa.	10,138	.78	1.17	1,880	516		2,048	2,300	140	1,137	2,055	45	17
37. Michigan State University	Mich.	9,199	.71	1.82	1,588	2,019		960	2,702	163	41	1,635		91
38. University of Iowa	Iowa	9,124	.70	.87		94		1,846	5,000	60	1,048	1,076		
39. University of Texas—Austin	Tex.	9,106	.70	1.65		597		1,804	2,260	114	2,758	1,573		
40. Northwestern University	Ill.	8,901	.69	1.29		245		1,726	4,529	172	492	1,716		21
41. University of Arizona	Ariz.	8,464	.65	.76	843	453		2,796	1,314	236	1,336	1,486		
42. Rutgers, The State University	N.J.	8,264	.64	.89	835	90		555	3,796	116	304	2,551		17
43. University of Florida	Fla.	8,115	.63	1.05	926	278		1,157	4,050	362	318	989		35
44. University of California—Davis	Calif.	8,063	.62	.95	29	2,058		176	3,731	196	972	901		
45. Baylor University	Tex.	8,055	.62	.10		25		333	7,410		108	179		
46. University of Hawaii	Hawaii	7,870	.61	.31	487	517	60	2,356	2,442	128	1,020	860		
47. University of Alaska	Alaska	7,505	.58	.04	523	271	25	3,678	487	121	763	1,637		
48. Texas A. &. M. University	Tex.	7,448	.57	.96	2,455	896		1,932	544	71		1,550		
49. University of Kentucky	Ky.	7,347	.57	.44	2,436	176		1,536	2,413	139	226	409		12
50. Vanderbilt University	Tenn.	7,179	.55	.47		154		661	5,808	5	46	505		
51. CUNY Mt. Sinai School of Medicine	N.Y.	7,142	.55			35			6,965			142		
52. SUNY State University—Buffalo	N.Y.	7,060	.54	.67		255		487	5,075		248	914		81
53. University of Kansas	Kans.	6,705	.52	.76	37	390		650	4,014	62	517	1,035		
54. North Carolina State University—Raleigh	N.C.	6,567	.51	.71	2,611	461		965	1,144	248	642	496		
55. Syracuse University	N.Y.	6,508	.50	.78		226		3,497	810	231	555	1,180		9
56. Oregon State University	Oreg.	6,495	.50	.91	1,048	534	15	1,332	1,784	955	97	730		
57. Brown University	R.I.	6,358	.49	.57		591		1,748	2,244		159	1,616		
58. Rice University	Tex.	6,294	.49	.42		841		1,694	377		2,568	814		
59. University of Oregon	Oreg.	6,292	.49	.60	2	495		812	3,764	24	123	1,072		
60. University of Tennessee	Tenn.	6,282	.48	.86	1,569	1,540		1,594	509	103	572	395		
61. University of Missouri—Columbia	Mo.	6,086	.47	.64	1,688	57		1,469	1,966	93	274	539		
62. University of New Mexico	N. Mex.	6,055	.47	.33		29	18	3,385	997	13	756	498	359	
63. Colorado State University	Colo.	5,999	.46	.55	968	291	90	893	1,296	435	546	1,480		
64. Indiana University—Bloomington	Ind.	5,786	.45	1.14		210		767	2,114		336	2,359		
65. Tulane University	La.	5,765	.44	.53		108		327	4,537		89	689		15
66. University of Georgia	Ga.	5,744	.44	.44	1,867	485		464	1,175	169	354	1,230		
67. Florida State University	Fla.	5,677	.44	.51		1,036	125	2,827	780	121	53	684	42	9
68. Carnegie Mellon University	Pa.	5,595	.43	.72		1,936		922	1,206	143	336	1,052		
69. University of Virginia	Va.	5,554	.43	.52		218		1,440	2,721	3	393	779		
70. University of Alabama—Birmingham [2]	Ala.	5,361	.41	.30				508	4,767		86			
71. University of Texas—M.D. Anderson Hospital and Tumor Institute	Tex.	5,320	.41			45		99	4,960		150	66		
72. George Washington University	D.C.	5,187	.40	.30		22	2	1,539	2,494	49	799	185	25	72
73. Iowa State University	Iowa	5,168	.40	1.68	1,768	143		965	1,344	124	192	625		7
74. University of Cincinnati	Ohio	5,050	.39	.50		36		1,675	2,807	198	125	209		
75. Rockefeller University	N.Y.	4,997	.39	.15		68		62	4,388			479		
76. University of Notre Dame	Ind.	4,832	.37	.40		1,399		632	747	43	238	1,773		
77. New Mexico State University	N. Mex.	4,829	.37	.13	649			2,498	266	240	1,027	149		
78. Boston University	Mass.	4,635	.36	.38		34		256	4,167			178		
79. University of Connecticut	Conn.	4,455	.34	.51	338	94		613	2,182	202	341	685		
80. University of Massachusetts	Mass.	4,446	.34	.39	751	224	20	688	1,232	340	205	975		11

See footnotes at end of table.

TABLE B-9.—*Federal R. & D. obligations to the 100 universities and colleges receiving the largest amounts, by agency, fiscal year 1969*—Continued

[Dollars in thousands]

Institution (in order of R. & D. obligations)	State	Total obligations	Percent of U.S. total	Percent of Ph. D. degrees in science and engineering, 1967–68	Department of Agriculture	Atomic Energy Commission	Department of Commerce	Department of Defense	Department of Health, Education, and Welfare	Department of the Interior	National Aeronautics and Space Administration	National Science Foundation	Office of Economic Opportunity	Department of Labor
81. Temple University	Pa.	$4,243	.33	.44		$132		$385	$3,228	$16	$164	$255		$63
82. Tufts University	Mass.	3,822	.29	.18		450		487	2,423	6	19	373	$55	9
83. University of Illinois—Medical Center	Ill.	3,741	.29	.27					3,662			79		
84. Indiana University—Indianapolis [3]	Ind.	3,699	.29			41			3,520			138		
85. University of California—Riverside	Calif.	3,651	.28	.45	$13	360		555	1,777	256	87	603		
86. Oklahoma State University	Okla.	3,637	.28	.81	1,210			916	685	169	90	442		125
87. Georgia Institute of Technology	Ga.	3,585	.28	.37		359		1,554	496	226	548	402		
88. SUNY Downstate Medical Center	N.Y.	3,584	.28	.07				35	3,503			46		
89. University of Texas—Southwestern Medical School	Tex.	3,581	.28	.04		29		10	3,397		145			
90. Rensselaer Polytechnic Institute	N.Y.	3,577	.28	.67		997		804	319	124	727	606		
91. Emory University	Ga.	3,554	.27	.20	55	75		61	2,928		244	191		
92. Louisiana State University—Baton Rouge	La.	3,536	.27	.72	1,208	212		404	367	50	467	828		
93. West Virginia University	W. Va.	3,522	.27	.35	995			658	1,237	249	190	193		
94. University of California—Santa Barbara	Calif.	3,483	.27	.23		210		613	938	3	212	1,507		
95. University of Vermont	Vt.	3,463	.27	.09	608	75		462	1,995	71	140	112		
96. Washington State University	Wash.	3,455	.27	.54	1,182	252		317	1,031	182	19	472		
97. University of Arkansas	Ark.	3,454	.27	.18	1,537	167		27	1,276	127	124	196		
98. Illinois Institute of Technology	Ill.	3,375	.26	.45		151		1,996	425	32	134	637		
99. Wayne State University	Mich.	3,346	.26	.47		138		193	2,484		20	439	72	
100. Polytechnic Institute of Brooklyn	N.Y.	3,343	.26	.47		71		2,276	393		152	451		

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[1] Main university only.

[2] Data for Ph. D. science and engineering degrees for the University of Alabama system included in data for University of Alabama—Birmingham.

[3] Data for Ph. D. science and engineering degrees for Indiana University—Indianapolis included in Indiana University—Bloomington.

SOURCE: National Science Foundation (CASE).

TABLE B–10.—*Federal obligations to universities and colleges for research institutes, seminars, or conferences, by detailed field of science and agency, fiscal year 1969*

[Dollars in thousands]

Field of science	Total	Department of Health, Education, and Welfare	National Science Foundation
Total, all fields	[1] $1,805	$570	$1,135
Physical sciences, total	235	3	232
Astronomy	7	----	7
Physics	225	----	225
Physical sciences, n.e.c.	3	3	----
Mathematics	249	----	249
Environmental sciences, total	[1] 184	8	76
Atmospheric sciences	50	8	42
Geological sciences	34	----	34
Environmental sciences, n.e.c.	[1] 100	----	----
Engineering	167	52	115
Electrical	40	----	40
Mechanical	10	----	10
Engineering, n.e.c.	117	52	65
Life sciences, total	127	77	50
Biological	11	11	----
Clinical medicine	66	66	----
Life sciences, n.e.c.	50	----	50
Psychology	21	14	7
Psychological sciences, n.e.c.	21	14	7
Social sciences, total	294	7	287
Anthropology	93	----	93
Economics	11	----	11
History	9	----	9
Political science	111	7	104
Social sciences, n.e.c.	70	----	70
Other sciences, n.e.c.	528	409	119

[1] Includes one $100,000 award from the Department of Commerce (ESSA).

SOURCE: National Science Foundation (CASE).

TABLE B-11.—*Federal obligations to universities and colleges for research institutes, seminars, or conferences, by institution and agency, fiscal year 1969*

[Dollars in thousands]

Institution (in order of research institute, seminar, or conference obligations)	State	Total	HEW	NSF
Total, all institutions	--------	[1] $1,805	$570	$1,135
1. University of Colorado	Colo.	[1] 250	--------	150
2. University of Texas—M.D. Anderson Hospital and Tumor Institute	Tex.	135	135	--------
3. University of Wisconsin—Madison	Wis.	102	20	82
4. University of Michigan	Mich.	96	--------	96
5. Bowdoin College	Maine	95	--------	95
6. University of Florida	Fla.	93	15	78
7. University of Houston	Tex.	75	30	45
8. Brandeis University	Mass.	64	4	60
9. University of Miami	Fla.	57	40	17
10. University of Pittsburgh	Pa.	55	--------	55
11. Michigan State University	Mich.	52	18	34
12. University of Iowa	Iowa	47	32	15
12. Colorado State University	Colo.	47	--------	47
14. Wake Forest University	N.C.	41	41	--------
15. University of Southern California	Calif.	36	36	--------
16. Virginia Polytechnic Institute	Va.	34	--------	34
17. New York University	N.Y.	32	32	--------
18. Stanford University	Calif.	26	--------	26
19. Rockefeller University	N.Y.	25	--------	25
20. University of Illinois—Urbana	Ill.	23	--------	23
20. University of Nevada at Reno	Nev.	23	--------	23
22. University of California—Davis	Calif.	22	22	--------
23. University of Arizona	Ariz.	21	--------	21
24. University of Texas at Austin	Tex.	20	--------	20
25. University of Rochester	N.Y.	18	15	3
25. University of Virginia	Va.	18	--------	18
27. Ohio State University	Ohio	17	17	--------
28. Wayne State University	Mich.	16	14	2
28. Washington State University	Wash.	16	--------	16
30. Duke University	N.C.	14	9	5
31. Johns Hopkins University	Md.	13	--------	13
32. Case Western Reserve University	Ohio	11	--------	11
32. University of Hawaii	Hawaii	11	--------	11
32. University of Puerto Rico—San Juan	P.R.	11	11	--------
35. Harvard University	Mass.	10	--------	10
35. University of Minnesota	Minn.	10	10	--------
35. University of Washington	Wash.	10	10	--------
38. University of California—Santa Barbara	Calif.	9	9	--------
38. New Mexico State University	N. Mex.	9	--------	9
40. University of Missouri—Rolla	Mo.	8	--------	8
40. University of North Carolina at Chapel Hill	N.C.	8	8	--------
40. Pennsylvania State University	Pa.	8	--------	8
40. University of Tennessee	Tenn.	8	--------	8
40. University of Vermont	Vt.	8	8	--------
45. Florida State University	Fla.	7	--------	7
45. Morehouse College	Ga.	7	--------	7
45. Northwestern University	Ill.	7	--------	7
45. University of Maryland	Md.	7	--------	7
45. George Peabody College for Teachers	Tenn.	7	7	--------
50. Massachusetts Institute of Technology	Mass.	6	6	--------
50. Polytechnic Institute of Brooklyn	N.Y.	6	--------	6
50. SUNY College at Plattsburgh	N.Y.	6	--------	6
50. University of Cincinnati	Ohio	6	6	--------
50. University of Puerto Rico-Mayaguez	P.R.	6	6	--------
55. Iowa State University	Iowa	5	--------	5

See footnote at end of table.

TABLE B-11.—*Federal obligations to universities and colleges for research institutes, seminars, or conferences, by institution and agency, fiscal year 1969*—Continued

[Dollars in thousands]

Institution (in order of research institute, seminar, or conference obligations)	State	Total	HEW	NSF
55. University of Maine—Orono	Maine	$5	-	$5
55. Lehigh University	Pa.	5	-	5
58. Merrill-Palmer Institute	Mich.	4	$4	-
58. SUNY, State University—Binghamton	N.Y.	4	4	-
60. SUNY College at Oswego	N.Y.	3	3	-
60. University of Oregon	Oreg.	3	-	3
62. University of Missouri—Columbia	Mo.	2	2	-
62. SUNY, State University—Stony Brook	N.Y.	2	-	2
62. Miami University	Fla.	2	-	2
65. University of Nebraska—Omaha	Nebr.	1	-	1

[1] Includes one $100,000 award made by Department of Commerce.

NOTE: Boldface numbers indicate same amount of Federal obligations received for this particular rank.

SOURCE: National Science Foundation (CASE).

TABLE B-12.—*Federal obligations to universities and colleges for facilities and equipment, by agency and field of science, fiscal year 1969*

[Dollars in thousands]

Agency	Total	Physical sciences	Mathematics	Environmental sciences	Engineering	Life sciences	Psychology	Social sciences	Other sciences, n.e.c.
Total, all agencies	$274,798	$19,004	$1,912	$13,229	$11,925	$47,304	$2,937	$10,752	$167,735
Department of Agriculture	1,171	-	-	-	-	-	-	-	1,171
Atomic Energy Commission	12,338	9,961	87	5	478	1,541	-	-	266
Department of Health, Education, and Welfare	229,460	5,814	436	2,600	7,958	41,304	2,000	9,462	159,886
National Institutes of Health	149,395	-	-	-	-	33,197	-	-	116,198
Office of Education	80,065	5,814	436	2,600	7,958	8,107	2,000	9,462	43,688
National Aeronautics and Space Administration	11	11	-	-	-	-	-	-	-
National Science Foundation	31,818	3,218	1,389	10,624	3,489	4,459	937	1,290	6,412

SOURCE: National Science Foundation (CASE).

Table B-13.—*Federal obligations to universities and colleges for facilities and equipment, by geographic division, State, and agency, fiscal year 1969*

[Dollars in thousands]

Geographic division and State	Total	Department of Agriculture	Atomic Energy Commission	Department of Health, Education, and Welfare	National Aeronautics and Space Administration	National Science Foundation
United States, total	$274, 798	$1, 171	$12, 338	$229, 460	$11	$31, 818
New England	43, 713	15	3, 109	37, 818	11	2, 760
Maine	55	------	------	23	------	32
New Hampshire	1, 141	------	------	754	------	387
Vermont	3, 628	------	------	3, 592	------	36
Massachusetts	35, 640	15	2, 809	31, 593	11	1, 212
Rhode Island	1, 913	------	------	1, 255	------	658
Connecticut	1, 336	------	300	601	------	435
Middle Atlantic	71, 078	84	2, 062	64, 866	------	4, 066
New York	21, 598	15	724	18, 577	------	2, 282
New Jersey	40, 918	------	560	39, 107	------	1, 251
Pennsylvania	8, 562	69	778	7, 182	------	533
East North Central	48, 107	140	2, 174	40, 542	------	5, 251
Ohio	9, 003	------	395	8, 368	------	240
Indiana	12, 000	37	446	11, 083	------	434
Illinois	15, 525	20	813	13, 330	------	1, 362
Michigan	6, 652	83	423	3, 833	------	2, 313
Wisconsin	4, 927	------	97	3, 928	------	902
West North Central	10, 265	54	535	8, 199	------	1, 477
Minnesota	796	------	145	418	------	233
Iowa	1, 870	19	------	1, 636	------	215
Missouri	4, 457	------	73	4, 058	------	326
North Dakota	425	------	------	351	------	74
South Dakota	101	------	9	40	------	52
Nebraska	470	35	------	343	------	92
Kansas	2, 146	------	308	1, 353	------	485
South Atlantic	27, 448	266	2, 654	19, 344	------	5, 184
Delaware	3, 243	6	------	3, 209	------	28
Maryland	3, 527	20	1, 774	1, 489	------	244
District of Columbia	1, 069	------	2	537	------	530
Virginia	2, 125	106	55	1, 761	------	203
West Virginia	872	63	1	770	------	38
North Carolina	6, 786	71	693	4, 945	------	1, 077
South Carolina	930	------	7	861	------	62
Georgia	5, 094	------	118	4, 820	------	156
Florida	3, 802	------	4	952	------	2, 846
East South Central	10, 167	165	176	9, 081	------	745
Kentucky	1, 736	75	32	1, 538	------	91
Tennessee	3, 627	17	93	3, 426	------	91
Alabama	4, 165	------	37	3, 627	------	501
Mississippi	639	73	14	490	------	62
West South Central	15, 918	192	115	14, 520	------	1, 091
Arkansas	340	40	------	275	------	25
Louisiana	4, 440	40	8	4, 254	------	138
Oklahoma	1, 003	30	------	776	------	197
Texas	10, 135	82	107	9, 215	------	731
Mountain	9, 882	121	97	8, 806	------	858
Montana	368	36	1	266	------	65
Idaho	1, 207	------	------	1, 183	------	24
Wyoming	155	34	------	25	------	96
Colorado	2, 728	------	49	2, 488	------	191
New Mexico	910	------	20	666	------	224
Arizona	1, 396	------	------	1, 358	------	38
Utah	2, 749	36	26	2, 472	------	215
Nevada	369	15	1	348	------	5
Pacific	37, 660	64	1, 200	26, 030	------	10, 366
Washington	11, 882	------	21	10, 330	------	1, 531
Oregon	3, 519	10	22	2, 974	------	513
California	20, 913	39	1, 157	11, 988	------	7, 729
Alaska	117	15	------	79	------	23
Hawaii	1, 229	------	------	659	------	570
Outlying areas [1]	560	70	216	254	------	20

[1] Includes Puerto Rico, Virgin Islands and Guam. The amounts to the Virgin Islands and Guam were a small fraction of the total.

Source: National Science Foundation (CASE).

TABLE B-14.—*Federal obligations to universities and colleges for facilities and equipment, by geographic division, State, and purpose of facility, fiscal year 1969*

[Dollars in thousands]

Division and State	Total	Research laboratories	Classrooms and laboratories	Library	Research equipment	Teaching/ training equipment	Computers and facilities	Hospital/ medical facilities	Other facilities and equipment
United States, total	$274, 798	$30, 687	$176, 313	$6, 500	$13, 063	$13, 585	$15, 253	$309	$19, 088
New England	43, 713	8, 067	28, 592	1, 500	1, 949	982	600		2, 023
Maine	55					55			
New Hampshire	1, 141	237	702		13	116			73
Vermont	3, 628	408	3, 156			64			
Massachusetts	35, 640	7, 316	23, 191	1, 500	1, 567	547			1, 519
Rhode Island	1, 913		1, 241		6	34	300		332
Connecticut	1, 336	106	302		363	166	300		99
Middle Atlantic	71, 078	3, 564	59, 458	700	2, 663	1, 893	1, 687		1, 113
New York	21, 598	1, 986	15, 302	700	1, 023	1, 085	606		896
New Jersey	40, 918	400	38, 982		596	240	700		
Pennsylvania	8, 562	1, 178	5, 174		1, 044	568	381		217
East North Central	48, 107	5, 079	32, 796	277	1, 828	2, 384	2, 538	300	2, 905
Ohio	9, 003	1, 154	6, 711		344	705	50		39
Indiana	12, 000	320	10, 502		486	376	64		252
Illinois	15, 525	775	12, 500	250	572	535	533	300	60
Michigan	6, 652	2, 080	1, 174	27	363	353	1, 891		764
Wisconsin	4, 927	750	1, 909		63	415			1, 790
West North Central	10, 265	737	6, 048		681	1, 126	1, 629		44
Minnesota	796		390		245	93	50		18
Iowa	1, 870	82	1, 510		19	259			
Missouri	4, 457	608	2, 299		30	340	1, 154		26
North Dakota	425		312		26	87			
South Dakota	101		25			76			
Nebraska	470	35	300		53	82			
Kansas	2, 146	12	1, 212		308	189	425		
South Atlantic	27, 448	4, 223	11, 971	801	1, 829	2, 567	1, 715		4, 342
Delaware	3, 243	6	3, 198			14			25
Maryland	3, 527	108	1, 300		1, 067	863			189
District of Columbia	1, 069		43	400	15	71	486		54
Virginia	2, 125	295	1, 439		41	286	64		
West Virginia	872	63	733			76			
North Carolina	6, 786	3, 751	458	401	687	377	698		414
South Carolina	930		639			174	117		
Georgia	5, 094		3, 527		19	310			1, 238
Florida	3, 802		634			396	350		2, 422
East South Central	10, 167	2, 511	5, 352	101	99	877	967		260
Kentucky	1, 736	75	1, 390		32	239			
Tennessee	3, 627	1, 382	1, 725		59	274			187
Alabama	4, 165	981	1, 870	101	8	238	967		
Mississippi	639	73	367			126			73
West South Central	15, 918	491	9, 597	2, 000	185	1, 077	1, 127		1, 441
Arkansas	340	40				147	153		
Louisiana	4, 440	229	2, 589			303			1, 319
Oklahoma	1, 003	53	633		100	158	59		
Texas	10, 135	169	6, 375	2, 000	85	469	915		122
Mountain	9, 882	1, 709	5, 448	1, 121	225	794	556		29
Montana	368	36	234			82			16
Idaho	1, 207		1, 166			41			
Wyoming	155	73			27	55			
Colorado	2, 728	1, 436	878		83	206	112		13
New Mexico	910		659		30	61	160		
Arizona	1, 396		1, 276			120			
Utah	2, 749	149	900	1, 121	85	210	284		
Nevada	369	15	335			19			
Pacific	37, 660	4, 236	16, 858		3, 541	1, 651	4, 434	9	6, 931
Washington	11, 882	1, 115	8, 454		58	232	134		1, 889
Oregon	3, 519	1, 232	1, 643		33	164			447
California	20, 913	1, 795	6, 161		3, 450	1, 165	4, 300	9	4, 033
Alaska	117	94				10			13
Hawaii	1, 229		600			80			549
Outlying areas [1]	560	70	193		63	234			

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[1] Includes Puerto Rico, Virgin Islands, and Guam. The amounts to the Virgin Islands and Guam were a small fraction of the total.

SOURCE: National Science Foundation (CASE).

TABLE B-15.—*Federal obligations for manpower development to universities and colleges, by detailed field of science and agency, fiscal year 1969*

[Dollars in thousands]

Field of science	Total	Atomic Energy Commission	Department of Health Education, and Welfare	National Aeronautics and Space Administration	National Science Foundation
Total, all fields	$436,270	$5,506	$375,655	$1,264	$53,845
Physical sciences, total	12,830	787	5,018		7,025
Astronomy	314				314
Chemistry	9,054	352	4,628		4,074
Physics	3,341	332	390		2,619
Physical sciences, n. e. c	121	103			18
Mathematics	8,324	12	3,617		4,695
Environmental sciences, total	3,955	10	2,921	99	925
Atmospheric sciences	166			99	67
Geological sciences	795		5		790
Oceanography	59		10		49
Environmental sciences, n.e.c	2,935	10	2,906		19
Engineering, total	12,017	2,030	6,496	449	3,042
Aeronautical	130				130
Astronautical	11	11			
Chemical	398	32	105		261
Civil	1,300		1,054		246
Electrical	1,106	4	137		965
Mechanical	472		56		416
Metallurgy and materials	254	12	68		174
Engineering, n.e.c	8,346	1,971	5,076	449	850
Life sciences, total	227,831	2,122	220,955		4,754
Biological	68,674	601	64,953		3,120
Clinical medicine	148,122		148,122		
Life sciences, n.e.c	11,035	1,521	7,880		1,634
Psychology, total	25,965		24,909		1,056
Biological aspects	15,417		15,417		
Social aspects	3,879		3,350		529
Psychological sciences, n.e.c	6,669		6,142		527
Social sciences, total	38,508		36,317	12	2,179
Anthropology	3,404		3,026		378
Economics	704		68	12	624
History	255		85		170
Linguistics	698		555		143
Political science	390		10		380
Sociology	27,099		26,837		262
Social sciences, n.e.c	5,958		5,736		222
Other sciences, n.e.c	106,840	545	75,422	704	30,169

SOURCE: National Science Foundation (CASE).

TABLE B-16.—*Federal obligations for manpower development to universities and colleges, by geographic division, State, and agency, fiscal year 1969*

[Dollars in thousands]

Division and State	Total		Atomic Energy Commission		Department of Health, Education, and Welfare		National Aeronautics and Space Administration		National Science Foundation	
	Amount	Percent distribution	Amount	Percent distribution	Amount	Percent distribution	Amount	Percent distribution	Amount	Percent distribution
United States, total	$436,270	100.00	$5,506	100.00	$375,655	100.00	$1,264	100.00	$53,845	100.00
New England	44,804	10.27	231	4.20	37,020	9.85	72	5.70	7,481	13.89
Maine	164	.04	2	.04	106	.03			56	.10
New Hampshire	1,017	.23			775	.21			242	.45
Vermont	1,078	.25			1,005	.27			73	.14
Massachusetts	29,985	6.87	200	3.63	24,368	6.49	72	5.70	5,345	9.93
Rhode Island	2,193	.50			1,724	.46			469	.87
Connecticut	10,367	2.38	29	.53	9,042	2.41			1,296	2.41
Middle Atlantic	84,880	19.46	687	12.48	74,957	19.95	145	11.47	9,091	16.88
New York	53,509	12.27	541	9.83	48,011	12.78	145	11.47	48,12	8.94
New Jersey	5,926	1.36	30	.54	4,243	1.13			1,653	3.07
Pennsylvania	25,445	5.83	116	2.11	22,703	6.04			2,626	4.88
East North Central	78,039	17.89	792	14.38	65,977	17.56	276	21.84	10,994	20.42
Ohio	15,363	3.52	104	1.89	13,308	3.54	103	8.15	1,848	3.43
Indiana	9,736	2.23	174	3.16	7,746	2.06	173	13.69	1,643	3.05
Illinois	25,560	5.86	277	5.03	21,538	5.73			3,745	6.96
Michigan	17,428	3.99	127	2.31	14,885	3.96			2,416	4.49
Wisconsin	9,952	2.28	110	2.00	8,500	2.26			1,342	2.49
West North Central	35,654	8.17	295	5.36	31,816	8.47			3,543	6.58
Minnesota	9,592	2.20	32	.58	8,725	2.32			835	1.55
Iowa	5,834	1.34	35	.64	4,974	1.32			825	1.53
Missouri	11,992	2.75	91	1.65	10,967	2.92			934	1.73
North Dakota	481	.11			352	.09			129	.24
South Dakota	449	.10			330	.09			119	.22
Nebraska	2,373	.54			2,202	.59			171	.32
Kansas	4,933	1.13	137	2.49	4,266	1.14			530	.98
South Atlantic	61,333	14.06	485	8.81	54,884	14.61	346	27.37	5,618	10.43
Delaware	422	.10			214	.06			208	.39
Maryland	12,582	2.88	32	.58	11,866	3.16			684	1.27
District of Columbia	5,944	1.36	87	1.58	5,240	1.39	119	9.41	498	.92
Virginia	5,637	1.29	100	1.82	4,842	1.29	70	5.54	625	1.16
West Virginia	1,441	.33	6	.11	1,263	.34	61	4.83	111	.21
North Carolina	17,129	3.93	76	1.38	15,729	4.19			1,324	2.46
South Carolina	1,461	.33	17	.31	1,206	.32			238	.44
Georgia	7,377	1.69	89	1.62	6,193	1.65	96	7.59	999	1.86
Florida	9,340	2.14	78	1.42	8,331	2.22			931	1. 3
East South Central	15,728	3.61	318	5.78	13,956	3.72	131	10.36	1,323	2.46
Kentucky	2,983	.68			2,680	.71			303	.56
Tennessee	7,701	1.77	312	5.67	6,718	1.79			671	1.25
Alabama	3,600	.83	1	.02	3,297	.88	131	10.36	171	.32
Mississippi	1,444	.33	5	.09	1,261	.34			178	.33
West South Central	25,617	5.87	238	4.32	22,413	5.97			2,966	5.51
Arkansas	1,190	.27			1,041	.28			149	.28
Louisiana	6,882	1.58	4	.07	6,265	1.67			613	1.14
Oklahoma	3,603	.83	56	1.02	3,034	.81			513	.95
Texas	13,942	3.20	178	3.23	12,073	3.21			1,691	3.14
Mountain	17,798	4.08	255	4.63	14,472	3.85	99	7.83	2,972	5.52
Montana	595	.14	14	.25	414	.11			167	.31
Idaho	182	.04	30	.54	79	.02			73	.14
Wyoming	254	.06	34	.62	32	.01			188	.35
Colorado	8,081	1.85	29	.53	6,832	1.82	99	7.83	1,121	2.08
New Mexico	1,103	.25	63	1.14	702	.19			338	.63
Arizona	2,929	.67	41	.74	2,301	.61			587	1.09
Utah	4,467	1.02	39	.71	3,992	1.06			436	.81
Nevada	187	.04	5	.09	120	.03			62	.12
Pacific	69,588	15.95	882	16.02	58,680	15.62	195	15.43	9,831	18.26
Washington	11,420	2.62	294	5.34	10,249	2.73			877	1.63
Oregon	5,958	1.37	81	1.47	5,046	1.34			831	1.54
California	50,637	11.61	507	9.21	42,081	11.20	195	15.43	7,854	14.59
Alaska	221	.05			157	.04			64	.12
Hawaii	1,352	.31			1,147	.31			205	.38
Outlying areas [1]	2,829	.65	1,323	24.03	1,480	.39			26	.05

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[1] Includes Puerto Rico, Virgin Islands and Guam. The amounts to the Virgin Islands and Guam were a small fraction of the total.

SOURCE: National Science Foundation (CASE).

Table B-17.—*Federal obligations for manpower development to the 100 universities and colleges receiving the largest amounts, by agency, fiscal year 1969*

[Dollars in thousands]

Institutions (in order of manpower development obligations)	State	Total	Atomic Energy Commission	Department of Health, Education, and Welfare	National Aeronautics and Space Administration	National Science Foundation
Total, 100 institutions		$375,023	$3,434	$330,406	$811	$40,372
1. Harvard University	Mass.	12,374	24	10,326		2,024
2. Univeristy of Michigan	Mich.	10,204	122	8,894		1,188
3. University of Washington	Wash.	10,202	293	9,234		675
4. University of Chicago	Ill.	9,856	146	8,884		826
5. Stanford University	Calif.	9,488	108	7,190	111	2,079
6. Columbia University [1]	N.Y.	9,394	40	8,691		663
7. University of Minnesota	Minn.	9,330	15	8,551		764
8. University of Pennsylvania	Pa.	9,303		8,732		571
9. University of California—Los Angeles	Calif.	9,115	117	8,220		778
10. Johns Hopkins University	Md.	8,838		8,513		325
11. Yale University	Conn.	8,468	29	7,550		889
12. University of Wisconsin—Madison	Wis.	8,454	110	7,259		1,085
13. University of California—Berkeley	Calif.	8,430	230	6,458		1,742
14. Duke University	N.C.	7,589		7,308		281
15. New York University	N.Y.	7,587	23	7,054		510
16. University of North Carolina—Chapel Hill	N.C.	6,942		6,542		400
17. University of California—San Francisco	Calif.	6,374		6,325		49
18. Washington University	Mo.	6,137	4	5,849		284
19. Case Western Reserve University	Ohio	6,127	5	5,544	85	493
20. University of Colorado	Colo.	5,870	13	5,241		616
21. Cornell University	N.Y.	5,777	128	4,543	111	995
22. Yeshiva University	N.Y.	5,315		5,232		83
23. Massachusetts Institute of Technology	Mass.	5,114	163	2,946		2,005
24. University of Pittsburgh	Pa.	4,957	5	4,705		247
25. University of Illinois—Urbana	Ill.	4,952	79	3,572		1,301
26. Ohio State University	Ohio	4,888	64	4,138		686
27. University of Rochester	N.Y.	4,837	263	4,311		263
28. University of Southern California	Calif.	4,632		4,368		264
29. Boston University	Mass.	4,544		4,437		107
30. Northwestern University	Ill.	4,475	36	3,817		622
31. University of Florida	Fla.	4,357	57	3,918		382
32. Tulane University	La.	4,354	1	4,214		139
33. University of Iowa	Iowa	4,201	4	3,835		362
34. University of Oregon	Oreg.	3,935		3,662		273
35. Michigan State University	Mich.	3,892	5	3,184		703
36. University of Utah	Utah	3,719	8	3,524		187
37. University of Kansas	Kans.	3,710	68	3,341		301
38. University of Maryland	Md.	3,630	32	3,239		359
39. Purdue University	Ind.	3,529	117	2,420	161	831
40. Emory University	Ga.	3,269		3,115		154
41. SUNY State University—Buffalo	N.Y.	3,266		3,022		244
42. University of Texas—Austin	Tex.	3,235	58	2,603		574
43. University of Virginia	Va.	3,144	49	2,889		206
44. University of Missouri—Columbia	Mo.	3,084	34	2,729		321
45. Indiana University—Bloomington	Ind.	3,071	6	2,516	12	375
46. Pennsylvania State University	Pa.	2,985	75	2,158		752
47. University of Cincinnati	Ohio	2,972	27	2,793		152
48. Vanderbilt University	Tenn.	2,958	111	2,525		322
49. Baylor University	Tex.	2,936		2,886		50
50. Wayne State University	Mich.	2,926		2,684		242
51. Rutgers, The State University	N. J.	2,689	18	2,283		381
52. University of Oklahoma	Okla.	2,654	56	2,347		257
53. Princeton University	N.J.	2,584	12	1,565		1,001
54. University of Illinois—Medical Center	Ill.	2,432		2,431		8
55. University of Miami	Fla.	2,393		2,244		149

See footnotes at end of table.

TABLE B-17.—*Federal obligations for manpower development to the 100 universities and colleges receiving the largest amounts, by agency, fiscal year 1969*—Continued

[Dollars in thous nds]

Institutions (in order of manpower development obligations)	State	Total	Atomic Energy Commission	Department of Health, Education, and Welfare	National Aeronautics and Space Administration	National Science Foundation
56. Florida State University	Fla.	$2,388	$21	$2,026		$341
57. Temple University	Pa.	2,377		2,276		101
58. California Institue of Technology [2]	Calif.	2,359	20	1,248	$84	1,007
58. University of Texas—Southwestern Medical School	Tex.	2,359		2,359		
60. CUNY Mt. Sinai School of Medicine	N.Y.	2,254		2,254		
61. University of California—San Diego	Calif.	2,175		1,822		353
62. University of Georgia	Ga.	2,164	18	1,640		506
63. University of California—Davis	Calif.	2,155	21	1,852		282
64. University of Alabama—Birmingham	Ala.	2,047		2,047		
65. Brandeis University	Mass.	2,029		1,816		213
66. Tufts University	Mass.	1,992		1,843		149
67. Indiana University—Indianapolis	Ind.	1,976		1,976		
68. University of Arizona	Ariz.	1,945	36	1,545		364
69. Georgetown University	D.C.	1,940		1,823		117
70. Syracuse University	N.Y.	1,925		1,615		310
71. SUNY Downstate Medical Center	N.Y.	1,900		1,895		5
72. Catholic University of America	D.C.	1,867	48	1,596	87	136
73. University of Tennessee	Tenn.	1,863	155	1,425		283
74. Brown University	R.I.	1,722		1,407		315
75. University of Tennessee Medical Units—Memphis	Tenn.	1,694	46	1,647		1
76. University of Connecticut	Conn.	1,690		1,430		260
77. University of Kentucky	Ky.	1,674		1,490		184
78. St. Louis University	Mo.	1,668	4	1,600		64
79. Oregon State University	Oreg.	1,659	81	1,079		499
80. West Virginia University	W. Va.	1,425	6	1,255	61	103
81. North Carolina State University—Raleigh	N.C.	1,406	67	794		545
82. Thomas Jefferson University	Pa.	1,392		1,383		9
83. University of Hawaii	Hawaii	1,352		1,147		205
84. Iowa State University	Iowa	1,337	31	906		400
85. New York Medical College	N.Y.	1,335		1,307		28
86. University of Mississippi	Miss.	1,281	5	1,188		88
87. University of Puerto Rico—San Juan	P.R.	1,275		1,275		
88. Virginia Commonwealth University	Va.	1,258		1,228		30
89. Colorado State University	Colo.	1,226	15	752	99	360
90. University of California—Irvine	Calif.	1,217		1,091		126
91. University of Louisville	Ky.	1,213		1,134		79
92. University of Massachusetts	Mass.	1,191	1	958		232
93. University of Arkansas	Ark.	1,190		1,041		149
94. Kansas State University	Kans.	1,187	69	896		222
95. Rice University	Tex.	1,174	29	793		352
96. University of Vermont	Vt.	1,075		1,005		70
97. Loyola University	La.	1,072	6	1,013		53
98. Columbia University Teachers College	N.Y.	1,047		1,047		
99. Hahneman Medical College and Hospital	Pa.	1,045		988		57
100. Marquette University	Wis.	1,005		933		72

SOURCE: National Science Foundation (CASE).

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[1] Main university only.

[2] Duplicate numbers indicate tie for place; e.g., same amount.

TABLE B-18.—*Federal obligations for general support for science to the universities and colleges receiving the largest amounts, ranked in various groups, by agency, fiscal year 1969*

[Dollars in thousands]

Number of institutions (ranked in order of general support for science obligations)	Total		Department of Health, Education, and Welfare (NIH)		National Science Foundation	
	Amount	Percent distribution	Amount	Percent distribution	Amount	Percent distribution
Total, all institutions	$156,989	100.00	$107,422	100.00	$49,567	100.00
First 10	36,702	23.38	14,555	13.55	22,147	44.68
Second 10	16,391	10.44	15,007	13.97	1,384	2.79
Third 10	13,784	8.78	13,221	12.31	533	1.08
Fourth 10	11,784	7.49	9,874	9.19	1,880	3.79
Fifth 10	9,863	6.30	8,049	7.49	1,834	3.70
First 50	88,484	56.36	60,706	56.51	27,778	56.04
Second 50	35,793	22.80	27,530	25.63	8,263	16.67
First 100	124,277	79.16	88,236	82.14	36,041	72.71
All other	32,712	20.84	19,186	17.86	13,526	27.29

SOURCE: National Science Foundation (CASE).

TABLE B-19.—*Federal obligations for general support for science to the 100 universities and colleges receiving the largest amounts, by agency, fiscal year 1969*

[Dollars in thousands]

Institution (in order of general support for science obligations)	State	Total obligations		Department of Health, Education, and Welfare (National Institutes of Health)		National Science Foundation	
		Amount	Percent of U.S. total	Amount	Percent of U.S. total	Amount	Percent of U.S. total
Total, 100 institutions		$124,277	79.16	$88,236	82.14	$36,041	72.71
1. New York University	N.Y.	6,822	4.35	2,242	2.09	4,580	9.24
2. University of Pittsburgh	Pa.	5,097	3.25	1,447	1.35	3,650	7.36
3. University of Southern California	Calif.	4,382	2.79	1,350	1.26	3,032	6.12
4. Washington University	Mo.	4,306	2.74	1,216	1.13	3,090	6.23
5. University of Arizona	Ariz.	3,526	2.25	344	.32	3,182	6.42
6. University of Virginia	Va.	3,272	2.08	1,368	1.27	1,904	3.84
7. University of Florida	Fla.	2,669	1.70	906	.84	1,763	3.56
8. University of Michigan	Mich.	2,531	1.61	2,407	2.24	124	.25
9. University of Nebraska—Lincoln	Nebr.	2,271	1.45	1,521	1.42	750	1.51
10. University of Minnesota	Minn.	1,826	1.16	1,754	1.63	72	.15
11. Meharry Medical College	Tenn.	1,790	1.14	1,790	1.67		
12. University of California—Los Angeles	Calif.	1,784	1.14	1,659	1.54	125	.25
13. University of North Carolina—Chapel Hill	N.C.	1,757	1.12	1,707	1.59	50	.10
14. Case Western Reserve University	Ohio	1,719	1.09	1,617	1.51	102	.21
15. University of Utah	Utah	1,688	1.08	880	.82	808	1.63
16. Ohio State University	Ohio	1,673	1.07	1,624	1.51	49	.10
17. Loma Linda University	Calif.	1,512	.96	1,512	1.41		
18. Columbia University [1]	N.Y.	1,502	.96	1,502	1.40		
19. University of California—Berkeley	Calif.	1,500	.96	1,273	1.19	227	.46
20. University of Missouri—Columbia	Mo.	1,466	.93	1,443	1.34	23	.05
21. Temple University	Pa.	1,461	.93	1,417	1.32	44	.09
22. University of Maryland	Md.	1,423	.91	1,326	1.23	97	.20
23. Johns Hopkins University	Md.	1,401	.89	1,373	1.28	28	.06
24. Marquette University	Wis.	1,396	.89	1,206	1.12	190	.38
25. University of Tennessee Medical Units—Memphis	Tenn.	1,380	.88	1,380	1.28		

See footnotes at end of table.

TABLE B-19.—*Federal obligations for general support for science to the 100 universities and colleges receiving the largest amounts, by agency, fiscal year 1969*—Continued

[Dollars in thousands]

Institution (in order of general support for science obligations)	State	Total obligations		Department of Health, Education, and Welfare (National Institutes of Health)		National Science Foundation	
		Amount	Percent of U.S. total	Amount	Percent of U.S. total	Amount	Percent of U.S. total
26. Northwestern University	Ill.	$1,372	.87	$1,284	1.20	$88	.18
27. Creighton University	Nebr.	1,368	.87	1,342	1.25	26	.05
28. Howard University	D.C.	1,351	.86	1,319	1.23	32	.06
29. Tulane University	La.	1,301	.83	1,301	1.21		
30. Indiana University—Bloomington	Ind.	1,282	.82	1,252	1.17	30	.06
31. Polytechnic Institute of Brooklyn	N.Y.	1,279	.81	56	.05	1,223	2.47
32. Harvard University	Mass.	1,229	.78	1,229	1.14		
33. Cornell University	N.Y.	1,214	.77	1,180	1.10	34	.07
34. SUNY State University—Albany	N.Y.	1,197	.76	696	.65	501	1.09
35. Georgetown University	D.C.	1,173	.75	1,146	1.07	27	.05
36. University of Pennsylvania	Pa.	1,168	.74	1,123	1.05	45	.09
37. University of California—San Francisco	Calif.	1,140	.73	1,140	1.06		
38. Yale University	Conn.	1,137	.72	1,087	1.01	50	.10
39. University of Alabama—Birmingham	Ala.	1,125	.72	1,125	1.05		
40. University of Puerto Rico—San Juan	P.R.	1,092	.70	1,092	1,02		
41. University of Louisville	Ky.	1,040	.66	1,040	.97		
42. Simmons College [3]	Mass.	1,034	.66	1,034	.96		
42. University of Washington [3]	Wash.	1,034	.66	1,016	.95	18	.04
44. Kansas State University	Kans.	1,012	.64	67	.06	945	1.91
45. Emory University	Ga.	1,009	.64	989	.92	20	.04
46. St. Louis University	Mo.	990	.63	977	.91	13	.03
47. Boston University	Mass.	965	.61	965	.90		
48. Chicago Medical School	Ill.	946	.60	946	.88		
49. University of Miami	Fla.	931	.59	931	.87		
50. Oregon State University	Oreg.	922	.59	84	.08	838	1.69
51. University of Kentucky	Ky.	909	.58	881	.82	28	.06
52. University of Colorado	Colo.	906	.58	733	.68	173	.35
53. DePaul University	Ill.	904	.58	743	.69	161	.32
54. West Virginia University	W. Va.	898	.57	848	.79	50	.10
55. Oklahoma State University	Okla.	889	.57	107	.10	782	1.58
56. University of Wisconsin—Madison	Wis.	875	.56	803	.75	72	.15
57. Illinois Institute of Technology	Ill.	871	.55	45	.04	826	1.67
58. Duke University	N.C.	870	.55	677	.63	193	.39
59. University of Iowa	Iowa	867	.55	821	.76	46	.09
60. University of Texas—Southwestern Medical School	Tex.	862	.55	862	.80		
61. University of Cincinnati	Ohio	861	.55	861	.80		
62. Hahnemann Medical College and Hospital	Pa.	851	.54	851	.79		
63. Arizona State University	Ariz.	818	.52	103	.10	715	1.44
64. University of Arkansas	Ark.	804	.51	765	.71	39	.08
65. Tufts University	Mass.	791	.50	791	.74		
66. Albany Medical College	N.Y.	785	.50	785	.73		
67. University of Vermont	Vt.	773	.49	773	.72		
68. Wake Forest University	N.C.	761	.48	761	.71		
69. Stanford University	Calif.	759	.48	705	.66	54	.11
70. University of California—Irvine	Calif.	757	.48	634	.59	123	.25
71. Medical College of South Carolina	S.C.	751	.48	751	.70		
72. George Washington University	D.C.	747	.48	722	.67	25	.05
73. Wayne State University	Mich.	730	.47	656	.61	74	.15
74. University of Texas—M.D. Anderson Hospital and Tumor Institute	Tex.	724	.46	724	.67		
75. Medical College of Georgia [3]	Ga.	715	.46	715	.67		
75. University of Rochester [3]	N.Y.	715	.46	698	.65	17	.03
77. University of Chicago	Ill.	714	.45	681	.63	33	.07
78. Yeshiva University [3]	N.Y.	710	.45	702	.65	8	.02
78. University of Rhode Island [3]	R.I.	710	.45			710	1.43
80. Michigan State University	Mich.	691	.44	448	.42	243	.49

See footnotes at end of table.

TABLE B-19.—*Federal obligations for general support for science to the 100 universities and colleges receiving the largest amounts, by agency, fiscal year 1969*—Continued

[Dollars in thousands]

Institution (in order of general support for science obligations)	State	Total obligations		Department of Health, Education, and Welfare (National Institute of Health)		National Science Foundation	
		Amount	Percent of U.S. total	Amount	Percent of U.S. total	Amount	Percent of U.S. total
81. Thomas Jefferson University	Pa.	$684	.44	$684	.64	----	----
82. Baylor University	Tex.	668	.43	668	.62	----	----
83. SUNY-State University—Buffalo	N.Y.	648	.41	557	.52	$91	.18
84. Texas A&M University	Tex.	647	.41	87	.08	560	1.13
85. Kirksville College of Osteopathy	Mo.	629	.40	629	.59	----	----
86. University of the Pacific	Oreg.	627	.40	618	.58	9	.02
87. Rensselaer Polytechnic Institute	N.Y.	621	.40	42	.04	579	1.17
88. University of California—Santa Cruz	Calif.	600	.38	----	----	600	1.21
89. Clarkson College of Technology	N.Y.	590	.38	----	----	590	1.19
90. Clark University	Mass.	589	.38	44	.04	545	1.10
91. Louisiana State University—New Orleans	La.	573	.36	573	.53	----	----
92. Dartmouth College	N.H.	569	.36	524	.49	45	.09
93. Vanderbilt University	Tenn.	567	.36	554	.52	13	.03
94. Southern College of Optometry	Tenn.	554	.35	554	.52	----	----
95. University of Wisconsin—Milwaukee	Wis.	553	.35	329	.31	224	.45
96. University of Denver	Colo.	545	.35	507	.47	38	.08
97. University of Oregon	Oreg.	535	.34	470	.44	65	.13
98. Bowling Green State University	Ohio	532	.34	----	----	532	1.07
99. University of Hawaii	Hawaii	524	.33	524	.49	----	----
100. College of Osteopathy Medical Surgery	Iowa	520	.33	520	.48	----	----

[1] Main university only.

[2] Duplicate numbers indicate "tie" for place; e.g. same amount.

SOURCE: National Science Foundation (CASE).

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